



(Datum och mottagare)

(Sveriges regering, EU kommissionen och parlamentet, SKL, etc)

Europaforum Northern Sweden: Opinions on Wind Power in Horizon 2020, for 2018-2020 and Beyond

Europaforum Northern Sweden (EFNS) is a partnership and network for councillors at local and regional level covering the four northernmost regions in Sweden; Norrbotten, Västerbotten, Västernorrland and Jämtland-Härjedalen, representing half the geographical area of Sweden. Our objective is to increase knowledge and awareness of policy at EU level, but especially to increase involvement in shaping EU policies in matters regarding Northern Sweden. Our opinion represents the positions of elected officials and the comments have been formed in close cooperation between the regions.

The regions have specifically strong research and business areas of strategic importance to EFNS and NSPA (Northern Sparsely Populated Areas in Northern Europe - Norway, Sweden and Finland), also including cooperation within the Barents region with Russia and within the Arctic region.

In an earlier position on the Energy Union, Europaforum Northern Sweden stressed, among other things, that:

- Northern Sweden has a surplus of energy, and is already contributing to securing Europe's energy supply. The region has the potential (under the right conditions) to contribute further to Europe's sustainable energy supply.
- Secure supply of energy in Europe may principally be achieved by increasing the share of renewable energy, effectivising energy delivery and a working internal market; and the measures taken by the Energy Union place emphasis on this sector.

This is fully in line with the statement that: "A European Energy Union will ensure that Europe has secure, affordable and climate-friendly energy. Wiser energy use while fighting climate change is both a spur for new jobs and growth and an investment in Europe's future". (http://ec.europa.eu/priorities/energy-union/index_en.htm), and with priorities such as "*supporting breakthroughs in low-carbon technologies by coordinating research and helping to finance projects in partnership with the private sector*".

A strong research & innovation and industry area, including SMEs and the public sector in the EFNS region, is **land-based wind power in cold climate and rural areas**.



The H2020 2016-2017 work programme for *'Secure, Clean and Efficient Energy'* mainly focuses on challenges for off-shore wind power rather than land-based wind power. The latter is relevant to and achievable for all EU Member States, as well as numerous other countries globally; therefore representing a market for European competitive power in the areas of research and innovation, competence, products and services.

For this reason, EFNS proposes that land-based wind power becomes the main object of focus for H2020 in 2018-2020, as well as the focus in 2021 and beyond. On this basis, the region of EFNS will be able to set up a European and international research centre and testbed for wind power in cold climates and sparsely-populated areas. Sparsely-populated areas are to be found all over Europe and globally – in the Arctic area, Africa, Asia, Australia, North and South America.

From 2018, H2020 should include specific challenges such as in the work programme for 2016-2017 (although this programme emphasized off-shore wind power); these challenges are also very relevant for land-based wind power, i.e. to *"achieve a very substantial reduction in Operation and Maintenance (O&M) costs through new O&M and control concepts, including logistics planning, decision making and operation, providing an optimized balance between maximizing generation and minimizing loads on the turbines, and reducing the number of inspections and repairs with more remote monitoring and operations"*. (In H2020 2016-2017: LCE-13-2016: Solutions for reduced maintenance, increased reliability and extended lifetime of off-shore wind turbines/farms).

EFNS and other European and international regions with cold climate can then contribute with innovative solutions in future cold-climate collaborative H2020 projects.

"Wind power to serve a quarter of Europe's electricity demand by 2030"

From the IEA Report 2015: *"Wind power can meet a quarter of Europe's electricity demand by 2030 if Member States deliver on climate and energy pledges, according to the latest forecasts by the European Wind Energy Association (EWEA). Over the next 15 years, EWEA expects wind power installations in Europe to reach 320GW of capacity, which could serve 24.4% of electricity demand across the continent. Today, Europe's 128.8GW can meet over 10% of European power consumption in a normal wind year. With 254GW from onshore wind and 66GW coming from offshore installations, the European wind industry will provide up to 334,000 direct and indirect jobs by 2030 in the most feasible scenario"*.

With onshore wind turbines today producing about 75 % more energy than offshore wind turbines, it is important to conduct further research and innovation for the development of more efficient onshore wind turbine farms.



Wind power has also been prioritized within, for example, the European Energy Research Alliance (EERA) and the European Strategic Energy Technology Plan (SET-Plan), as well as within the ETPs (European Technology Platforms) such as the European Technology Platform for Wind Energy (TPWind).

Wind power globally, in Europe and in Sweden

The most rapid expansion of wind power in the world is occurring in China, which is also planning to invest in, construct and test wind farms in the EFNS region. China also experiences a seasonal cold climate in its northernmost provinces and mountain ranges.

One example of Chinese investment in EFNS is a joint venture, planned between Jämt Vind (in Jämtland-Härjedalen) and Hunage (a subsidiary of SPIC, the State Power Investment Corporation, one of China's largest state-run energy producers). The first stage of this cooperation foresees the construction of 30 wind farms, which are calculated to create 550 person-years of employment, of which half will be for the period of construction and half for operational management.

Within the Horizon 2020 framework and the Energy Union, the development of wind power and wind power research & innovation is a central initiative for achieving the EU's climate and sustainability targets, in addition to contributing to meeting the global climate challenge. This is therefore an opportunity for the EU to strengthen the international competitiveness of the research and industry sectors (including innovative SMEs) as providers of competence, products and services for wind power. Here the International Energy Agency (IEA) is an important collaborative platform which also has a focus on wind power in cold climates.

From the IEA Report 2015: *"The International Energy Agency (IEA) Wind Agreement is a vehicle for member countries to exchange information on the planning and execution of national largescale wind system projects and to undertake co-operative research and development (R&D) projects. In 2015, there are 25 contracting parties to this agreement. The contracting parties are designated by the 20 Member Countries, the European Commission, the Chinese Wind Energy Association, and the European Wind Energy Association. Contracting partners also include Canada, Mexico, South Korea and the USA."*

Wind power in cold climate

Sweden, with a population of 10 million, generated 11.6 TWh in 2014, working toward a planning framework of 30 TWh from wind by 2020. The rapid increase in (mainly) land-based wind power in Sweden is occurring to a great extent within the EFNS region, with its particular challenges in terms of the construction, operation and maintenance of wind farms in sparsely populated, forested and mountainous cold-climate regions.



The Swedish Energy Agency has a special research programme focusing on wind power in cold climates, so as to generate knowledge, competence and technological development, which in the long term enables an increased propagation of wind power within the Swedish and the global energy system, as well as advancing research & development in collaboration between academia and the business sector.

The Swedish Energy Agency works closely with organisations such as VINNOVA, Sweden's innovation agency; VINNOVA also collaborates in an on-going project for a wind power test centre in cold climate.

Wind power in mountainous terrain and cold climates is gaining more and more interest, not least as it offers vast windy areas in which development of large-scale wind power establishments is possible. Northern Sweden possesses many such areas, where the wind potential is high. However, it is also of great global importance to establish such facilities with the smallest possible environmental impact, which in turn requires further research and technical development. Wind turbines in the northern part of Sweden are furthermore facing a number of challenges not seen in areas with warmer climates.

However, these challenges also apply to many other countries with cold climates, both within Europe and globally; thus there is great potential for international cooperation within Horizon 2020.

From the IEA Report 2015: *“Wind Energy in Cold Climates (WE in CC) refers to sites that may experience either or both significant time or frequency of either icing events or low temperatures outside the operational limits of standard wind turbines (WT). Apart from lower energy production, which directly influences a wind farm's cash flow, legal issues, such as ice throw and increased noise, may reduce production. Additionally, fatigue loading and operation and maintenance (O&M) aspects particular to WE in CC need to be considered. WT operating in cold climates are located around the world in, for example, Asia, North and South America and Europe... This means that the stimulus for further development of wind power projects and technology in cold climate areas is strong”.*

Wind power in the EFNS region

The EFNS region enjoys a surplus of clean and sustainable energy, from sources such as water, wind and bioenergy; and is already contributing to securing Europe's energy supplies in the framework of the Energy Union. The region has four universities with research that is relevant to wind power, as well as involvement in wind-power-related initiatives in the regional, national and European arenas.

The EFNS region produces many examples of research and experience relevant to wind power (see ANNEX below).

The region has great potential for making additional contributions to Europe's sustainable energy reserves by means of research, innovation and expansion of wind power in cold climates.



EFNS proposal

- That land-based wind power becomes a major focus in the Horizon 2020 work programme 2018-2020 and into 2021 and beyond. This will enable the EFNS region to create a European and international research centre and testbed for wind power in cold climates and sparsely-populated regions, and thus make a serious contribution to Europe's international competitiveness.
- That a European Innovation Partnership (EIP) is established for European sparsely-populated regions, with a focus on wind power in sparsely-populated regions and cold climates.
- That the EFNS region is charged with the mission to produce proposals for Calls in the Horizon 2020 Work Programmes for 2018-2020 and beyond 2021, targeted towards land-based wind power in sparsely-populated regions and cold climates, coordinated with other European sparsely-populated regions and in concert with regional programmes, structural funds and strategies such as Smart Specialisation, in order to achieve synergies with, and capacity building for, Horizon 2020.

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ANNEX: examples of wind power establishments and funding in EFNS regions

AEOLUSFUTURE: The H2020 project AEOLUS4FUTURE, coordinated by Luleå University of Technology (LTU). The primary research aim of the project is to develop sustainable WES (wind energy systems) for a variety of EU needs. In the development of such a system, there are a number of detailed scientific and technical issues that will be addressed by the project, starting from identifying the wind energy potential (both land-based and off-shore, including the built environment) to the design of a sustainable and highly efficient WES. Additionally, the new and challenging load conditions imposed on wind farms located in places where existing types of wind turbine tower are not suitable require the development of new support structures for wind energy converters. This fosters new structural concepts, taking advantage of high-performance materials e.g. high-strength steel and novel maintenance-free fasteners.

DE-ICING PROJECT: LTU, together with Europe's leading research institute in polymer fibre composites, Swerea Sicomp (located in the EFNS region), is testing de-icing equipment for wind turbines. This is a cooperation with Skellefteå Kraft and Vattenfall. Constructing wind farms at sea has proven to be a costly venture; therefore interest has grown in building land-based systems, and northern Sweden is a region of highest interest for wind power companies. The wind power initiative at LTU is taking place in the framework of the Swedish wind power technology centre (thematic area: Cold Climates), where LTU researchers from several different sectors work closely with Sicomp. The challenge is being met by means of de-icing of the wind turbines, an area in which LTU has established expertise.

BLAIKEN WIND FARM (Västerbotten): Together with Fortum and Blaiken Vind AB, Skellefteå Kraft has begun building a wind farm in the vicinity of Blaiken, Västerbotten. The facility has been chosen as a demonstration plant by the EU's NER300 programme, one of the world's largest funding programmes for climate-neutral energy. When construction is complete in 2017, the wind farm will consist of 99 wind turbines, with a capacity of 247.5 MW. This will make Blaiken one of the largest land-based wind farms in Europe. Yearly production of ca. 700 GWh/year will cover the annual energy needs of 161 500 homes, and total investment will be ca. 3.3 billion Swedish Kronor (€323.7 million).

WIND POWER PLATFORM (Jämtland-Härjedalen): The wind power centre in Jämtland-Härjedalen has for example coordinated a national VINNOVA H2020 effectiveness platform focusing on wind power in cold climates. The platform was set up in cooperation with global, national and regional stakeholders and actors such as Vattenfall, Eon, Statkraft, Jämtkraft, Siemens, Vestas, and Enercon, as well as universities such as Chalmers and (in the EFNS region) Luleå University of Technology and Mid-Sweden University.



In this region, Sweden's largest land-based wind farm was put into operation in 2010, as well as training program in wind power. The region is now planning a national and international test arena for wind power in cold climates.

A wide variety of northern SMEs are involved in the construction and technical development of wind power systems. 400 companies have supplied the wind power sector in Jämtland-Härjedalen, of which half are located in the region. In 2014 wind power contributed 1000 working years for the region, and development of wind power was behind the increase in growth of the fast-growing enterprises in the year 2014, and therefore the growth of the region (although the inhabitants in the county of Jämtland-Härjedalen number 126 765, the county accounts for 12% – 49 443 square kilometres – of Sweden's land area, and is Sweden's third-largest county, despite having only 1.5% of the Swedish population).

Other sparsely-populated areas in Europe which focus on wind power may enjoy similar opportunities for growth, thereby adding to the likelihood that Europe will become a leading global actor in wind power.

LARGE-SCALE WIND FARM PROJECTS NORRBOTTEN: All counties and many municipalities in the EFNS region have wind farms, and ambitious construction projects are under way, for example in Norrbotten County (Piteå municipality) where a new wind farm consisting of 1,100 turbines is planned, each about 200 metres high including tower and rotor blades. Total energy production is projected to be 8-12 TWh. The completed wind farm facility will be one of the largest in the world.

INTERNATIONAL INVESTMENT: In cooperation with national and regional actors, international partners such as China (above) are planning wind power initiatives in the region; as for example the Norwegian state energy producer Statkraft, and the cellulose company SCA (SCA Europe's largest private forest owner) which already owns wind farms in the EFNS region and intends to construct new ones.

FUNDING IN THE EFNS REGION: At a regional level both regional funding and structural funds contribute, together with H2020 funding instruments, to wind power research, innovation and capacity building, as well as to international competitiveness in the industry and commercial sectors. At national level, contributors are for example The Swedish Energy Agency (with special focus on wind power in cold climates) and VINNOVA.