

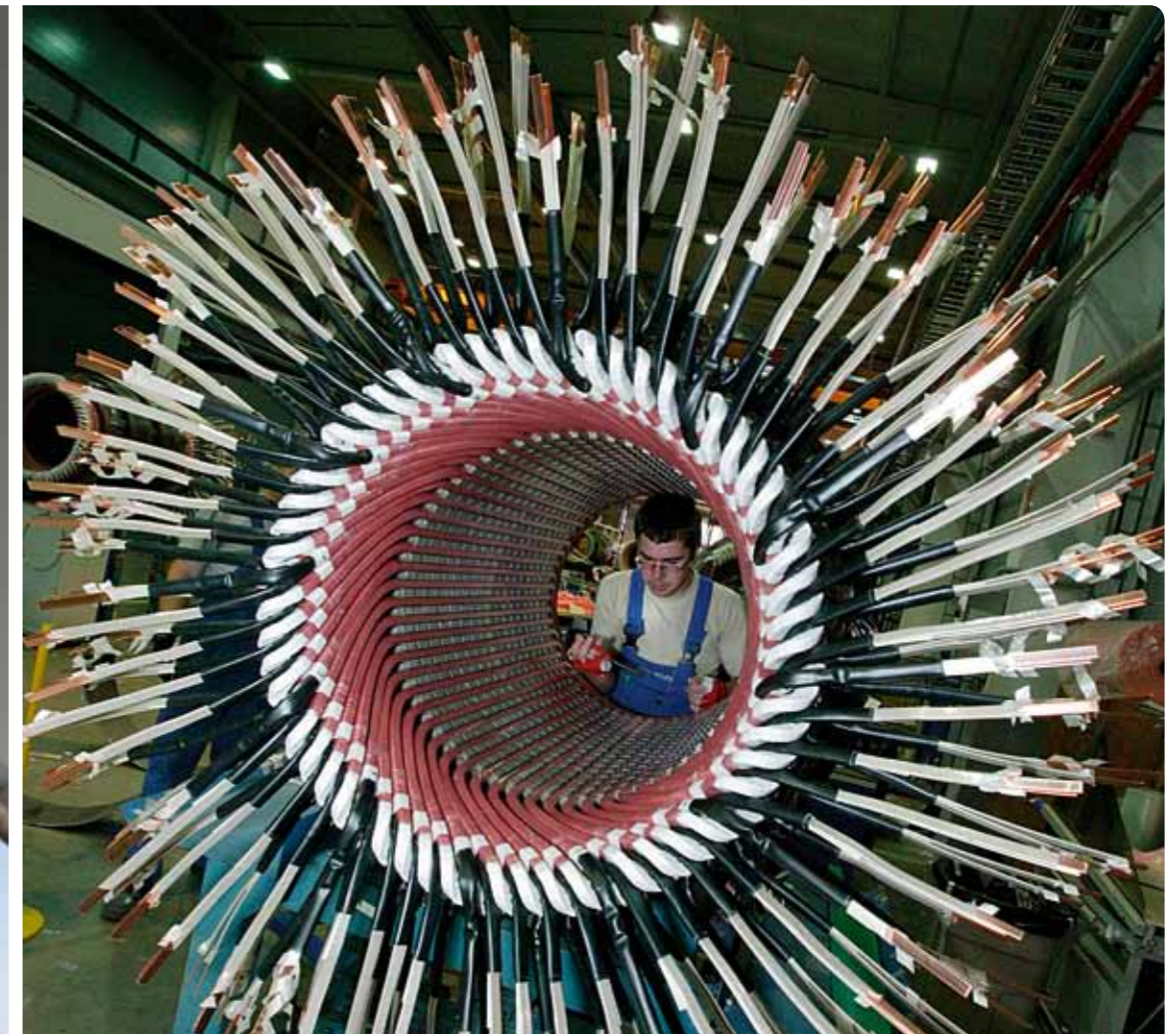
■ coastline more than 2500 km ■ home of ABB's wind generators ■
■ "e-Estonia" ■ success stories ■ Estonian Wind Power Cluster ■



Wind and

Industry in Estonia

Young dynamic wind industry growing in Estonia



- **High potential.** Estonia with an ambition to reduce the oil-shale based electricity production and to diversify our energy production portfolio has good potential in wind energy. 184MW installed so far, 650MW as a goal to reach 2020 targets but real potential for much higher deployment
- **Central location.** Situated in the heart of the windy Baltic Sea Region, close to high-speed wind energy developing markets like Finland and Sweden, but also to Russia with a big untapped potential for both onshore and off-shore wind power
- **Excellent metalworking skills.** The sector's key specialties are fabricated metal products, precision tungsten carbide dies, high-end welding, tool making, machinery and equipment, automotive components and ship building
- **Long history in shipbuilding.** Shipyards today adopting to serve also offshore wind industry
- **Next golden offshore area.** Having in mind that Baltic Sea Region will play a big role in the coming offshore wind energy development, Estonian companies breaking into the offshore wind industry is likely to increase
- **e-Estonia.** A country that has become one of the leading e-societies in the world with over 600 e-government services, advanced internet and telecom infrastructure, and tech-savvy population.

Examples of success stories from Estonia so far



VESSELS AND FOUNDATIONS

BLRT Grupp is a multi-profile concern with a well-developed modern structure and active participation in the Estonian, Latvian, Lithuanian, Finnish, Norwegian, Polish, Ukrainian and Russian markets. Incorporates 77

companies and holds leading positions in areas as shipbuilding, ship repair, production of metal constructions, metal trading, machine building, scrap processing, production of industrial gases, transport and port services. Has

the know-how and the practical work experience in the manufacturing of various structures and special mounts for both on- and off-shore wind farms and also in wind farm catamarans and jack-up crane vessels.

COMPONENTS



With over 30 years experience, **ABB** provides a wide range of products as well as integrated solutions to wind energy customers. These include generators, converters, motors, switchgears and low voltage products to wind turbine OEMs, and all needed power equipment - from transformers and substations to electrical balance-of-plant supply.

In Estonia, ABB started to invest in to the wind power generator production in 2002. Over the years, implementing a full manufacturing process from producing the internal parts to the final assembly of the generators, today major part of ABB globally manufactured wind generators is made at Electrical Machines factory in Estonia. In addition to generators, also AC converters for wind power industry segment are produced in Estonia at the Low Voltage Drives factory. Over the 20 years, ABB has invested some 70 MEUR in Estonia, mainly in production facilities related to the field of renewable energy.



INSTALLATION

Competence in installations of power plants can be found in Estonia. **Scanweld AS** is engaged in the realisation of large-scale industrial projects and has extensive experience, in the capacity of both contractor and subcontractor, in special construction, particularly for projects requiring high-level welding. They manufacture various structures and carry out the assembly of wind turbines. A recent new topic they are looking into is producing masts for small scale wind turbines.



SERVICE

Based on Empower AS, the energy infrastructure construction company's wind energy maintenance division, and co-operation together with the wind energy producer-Nelja Energia, a service provider for wind farms was found in June 2010 under the name of **Empower 4 Wind OÜ**. With their strengths in neutrality, responsibility and flexibility, in less than two years Empower 4Wind is offering the maintenance services for ca 62 % of wind farms in Estonia. They are also the only company in Estonia owning ISO 9001 and 14001 certificates for "Wind farm operation and maintenance".



SCIENCE

In cooperation with **Tallinn University of Technology, Ubik Solutions** has developed an innovative DC/DC interface converter for autonomous power supplies with impressive technical characteristics. Further research of power conditioning systems with improved power quality and flex-



ibility is aimed for residential wind turbines (test model max power 25 kVA) based on permanent magnet synchronous generators. Ubik Solutions and its activities are solely financed by 4E Tehnoinvest, an Estonian-based fund focused on renewable energy related technologies.



INNOVATION

The Government of Estonia has launched an **Electric Mobility Programme** for Estonia where more than 500 electric cars were bought for social workers, a grant scheme was launched to support acquisition of electric cars, and charging infrastructure for electric cars covering the whole territory of Estonia is built.

As a result of government initiatives, up to 1000 electric cars are expected to drive on the roads of Estonia by the end of 2012. Creating a perfect storing facility for wind energy, the increasing share of electrical cars matches well with the increasing share of wind energy in Estonia.

INFRASTRUCTURE

Estonia has several large-scale industrial parks near Estonia's largest ports. For example just 45 km west from Tallinn, in City of Paldiski there is under development a **PAKRI Science and Industrial**

Park for alternative energy and environmental technology sectors for creating an excellent opportunity to become a key player in the Baltic Sea area that consolidates renewable energy issues and competence.



Estonia – the windy country

Estonia as a country is widely open to the sea and therefore for the winds. As a part of the East European Plain, Estonia is a flat territory where uplands and plateau-like areas alternate with lowlands, depressions and valleys. These land forms, alongside with the coastal cliffs in northern and western Estonia, are the larger features of Estonian topography. In Estonia there are excellent opportunities to catch the winds from the Baltic Sea. The total length of the coastline of mainland is 1242 km and of islands (in total ca 1500 sea islands) – ca 2551 km, including the coastline of Saaremaa (854 km), the largest island in Estonia.

Estonian Wind Power Cluster

Estonia is situated in the middle of the Baltic Sea region and has great potential in developing wind power. The country is, however, interested in taking it one step further. The wind power cluster was born out of Estonian companies' desire to take part in the development of rapidly and innovatively evolving wind power industry.

The cluster's partners include companies active in steel, wind energy development and electricity production industries, as well as educational and research institutions. The umbrella organisation of the cluster is the Estonian Wind Power Association and the cluster is supported by the European Regional Development Fund and the Tallinn City Enterprise Board. Estonian Wind Power Cluster unites engineers, scientists and entrepreneurs working towards establishing Estonia as a wind power industry country. Wind Power Cluster members have excellent centuries-old experiences and knowledge in shipbuilding, production of steel constructions, transport and port services. Estonian Wind Power Cluster members are using their competence, research and innovation to offer best solutions in the rapidly developing wind power industry.



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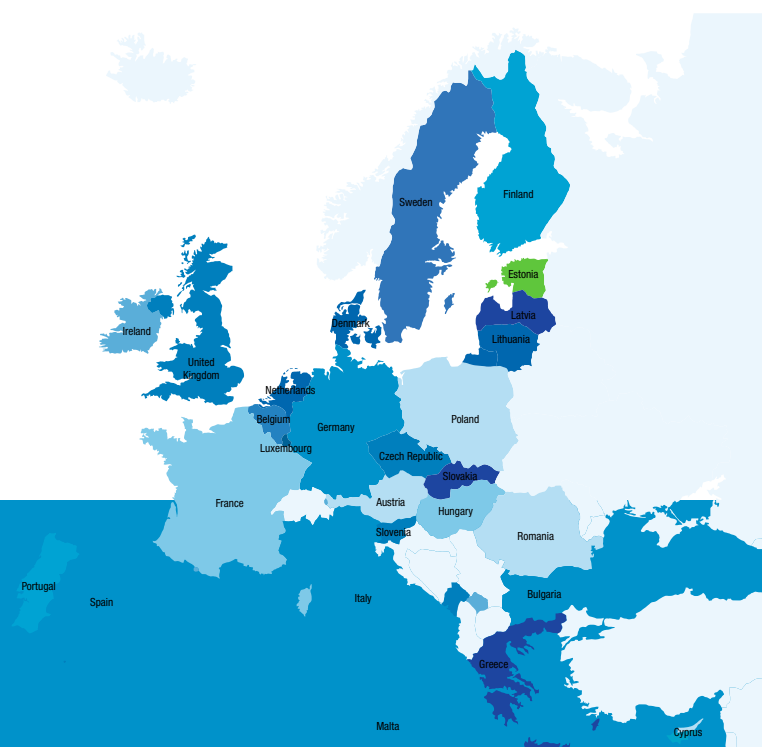
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