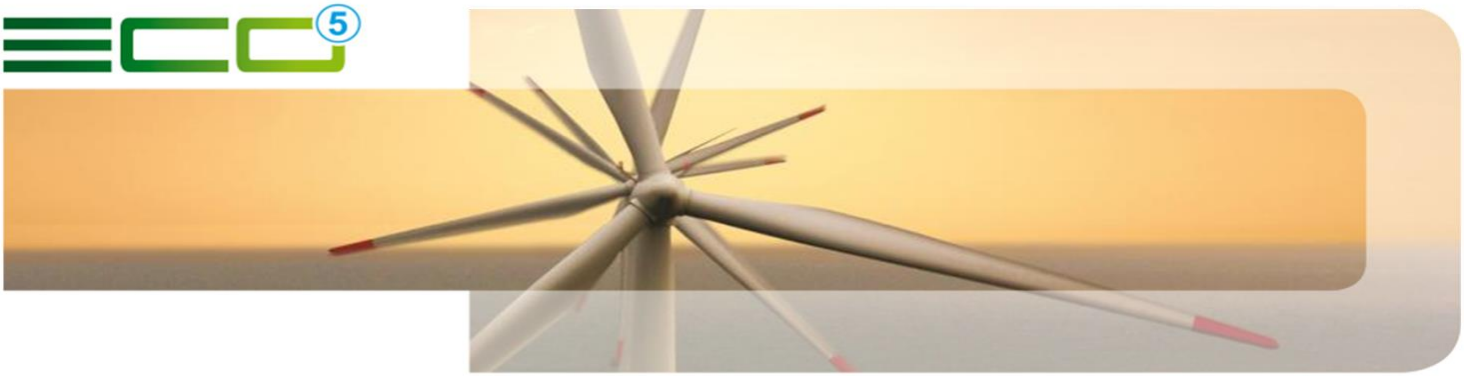


April, 2013

What Impact will Superconductors have in the Wind Sector?

„Big trends in wind are larger turbines, growth in low wind sites, and going off-shore. This comes in combination with increasing cost pressure.

To succeed, this needs innovative drive train solutions."

Superconductivity is an emerging materials technology with a high potential of developing innovative and disruptive technologies for a competitive market like wind power. Superconductivity is mature enough to credibly be considered for wind turbine generators.

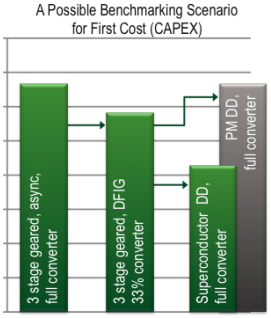
While the obvious advantage seems efficiency, superconductors even more importantly enable very light-weight and cost-efficient designs. Superconducting electrical generators are mostly conceived as ac-synchronous machines with superconductive field windings and a conventional (copper based) armature connected to a full power converter.

Market focus of superconductive generators is on near-future mainstream size wind power generators. Internal studies demonstrate that by addressing markets of mass manufactured products like mainstream wind power generators superconductors allow both the lowest cost and the lowest top head mass solution.

Thus, in a scenario of mass manufactured roll-out the technology offers the opportunity to lower CAPEX considerably – even beat lowest cost options of geared drives.

Facts:

- Superconductors are perfect electricity conductors
- Superconductors allow very light-weight generators
- Savings in material decrease CAPEX of generators
- Direct Drive concepts increase reliability.



Potential Cost Reduction with Superconducting Generators.

ECO 5 Recommendations for Action

Superconductivity offers a major opportunity with an additional unrivalled potential towards larger power ranges. We propose a number of strategies for future risk management and limitation of exposure:

Know about it: Superconductors are currently not utilized in wind on a commercial scale. However, this technology is widely used in other industries. Newer materials allow extending this technology economically into the energy sector. The ECO 5 team can tremendously assist in tailoring practical market intelligence and work out a strategic approach for adoption of this technology.

Access it: A clever design of a generator allows considerable cost saving potential. At the same time those components, which are new in this field, need to be sourced and introduced with lowest cost and highest securitization. The ECO 5 Team can provide all services from design and R&D project to organization of the supply chain.

Introduce it: A new technology must be prototyped and tested. The ECO 5 Team has vast experience in bringing superconductive technology into reality. We can support the building of a prototype and testing.

„We have decades of experience in high temperature superconductivity. We know how to harness the power of these wires and how to package them into a rugged and reliable system."

Why ECO 5?

The ECO 5 Team has a strong strategic and operational heritage; engineers worked extensively for operating companies and understand the priorities that clients have in the development and delivery of projects.

Within one compact organization, we have an unrivalled range and depth of knowledge and expertise of all aspects that are vital in delivering a sound project.

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ECO 5 Team: Engineering Services for Highly Efficient Power Systems

- Rotating Machines
- Coils and Magnets
- Inductive Heating Systems
- Cryo Technology
- Materials Science
- Grid Expansion and Protection.

As an engineering provider, the ECO 5 Team is specialized in the development of high-efficiency power systems. Our focus is on renewable energy generators for wind, hydro, and wave power. Beyond these fields, core competencies lie in fault protection of high-voltage grids, and inductive metal heating. In these areas we contribute highly specialized know-how in the application of industrial-grade superconductors as well as in more conventional copper and permanent magnet solutions. Strategic and marketing competencies complement the technical expertise.

We manage customer projects from strategic line-up, feasibility analysis up to prototyping. In technical expertise and tools we cover materials science aspects, multiphysics FEA, and 3D CAD. Supporting these activities, we offer our competence in the areas of cryo technology, plant and process safety, and the analysis of IP rights pertaining to a technological development.

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