

17 June 2008

Energy Research Strategy Submissions,
Energy Planning Division,
Department of Communications, Energy and Natural Resources,
Adelaide Road,
Dublin 2

Dear sir/madam,

I congratulate you the Energy Research Strategy, and offer the following comments, particularly related to section 8 of the strategy “Strategic Line 3: RD&D in Sector Specific Fields”. Five areas are mentioned, all worthy. I would like to suggest a sixth – small and medium size wind technology.

Section 8.2.2 states that other (specific) proposals outside of the five areas will also be considered, providing that a) they are relevant to Ireland, b) research excellence exists in Ireland and c) they are coordinated with European and international research. I assume the same criteria would apply to considering an additional R&D area for the Research Strategy (although it can be argued that these criteria are not completely met by Irish R&D in the five proposed areas). I will discuss these points below.

Relevance of wind technology to Ireland

Wind energy is clearly the leading renewable energy technology in Ireland, and will continue to be so. It is our least expensive and most abundant form of renewable energy. Sustainable Energy Ireland resource studies indicate that it is roughly an order of magnitude higher in potential than other renewable resources, and greater than all other resources combined. We have a national goal of 33% renewable electricity by 2020, mostly from wind. It is easy to imagine that the country will be largely wind-powered by 2050.

The future for the wind energy industry must also be put in the context of the transformation of the world energy market towards renewables. In 2007, 40% of the new generating capacity in Europe was wind energy. In the United States the figure was 30%. This is a huge market, and wind capacity continues to grow at about 30% annually. Manufacturing of small wind turbines in the UK grew by 80% in 2006 and by 120% in 2007. About a third of these were exported.

The market for such technology will be extremely large in the future. In the same way that large wind was initially dismissed as too expensive but then became commercial due

to mass production and rising conventional energy prices, small and medium size technology will become much more commercial over the coming decade. This is a potential opportunity for Ireland to be directly involved with the technology.

Having established the relevance of wind energy research to Ireland, I would like to propose that the Energy Research Strategy include Small and Medium Size Wind Turbine Technology.

Irish Research Excellence in Small and Medium Wind Energy

A growing amount of applied research is taking place in this area, and we believe this is where Irish wind R&D should initially be focused.

At Dundalk Institute of Technology we are conducting applied research in this area, and to give you a feel for the possibilities for R&D we will mention some of the research areas and potential future work:

- Small wind rotor design – We are doing work with EireComposites (Galway) regarding developing a line of small wind turbine rotors using thermoplastic technology. There are very few small/medium blade suppliers, but there will be as the market develops.
- Wind autoproduction – We are producing half of our electricity needs from our campus wind turbine. We have done applied research with many companies and institutions in this area, and have developed practical and theoretical expertise. This application is uncommon at present but will become much more common in the future as energy prices rise.
- Heat from wind – We are doing work with Glen Dimplex (Louth) concerning the potential for small wind turbines to help provide heat in energy efficient houses.
- Small wind turbine generators – We have patented a generator winding technique that improves the efficiency of small single phase induction generators for use in wind turbines.
- Small wind turbine transmissions – Gearboxes are a major failure item in large wind turbines. We are beginning to investigate the use of modern belt-drive technology for transmissions in small/medium wind turbines. It is difficult to use this technology in large turbines due to the high reduction ratios required.
- Small wind turbine overspeed control – By the end of this month we will have filed a patent in this area. We have received Enterprise Ireland Proof of Concept funding and presently have a researcher to develop the idea, which makes use of blade deformation to “spoil” the aerodynamics. Large turbines use blade pitching, which performs multiple functions, but the cost of the pitching mechanism generally cannot be justified on small turbines. We have another patent under consideration in this area.
- Other
 - Wood blade technology
 - Wood tower technology
 - Complete wind turbine designs for licensing
 - Regenerative drives for small/medium turbines

The potential for excellence in wind energy applied R&D is clear.

Co-ordination with EU programmes

In general the applied research is being done by large wind turbine companies, and the fundamental research is being carried out by European Universities, and almost all of it concerns large wind turbines. The EU “TP Wind” project is a focal point of European wind energy research, and it is almost entirely focused on large wind.

This means there is not much EU research to co-ordinate with. We are members of the IEA Small Wind Expert Group, but there is limited work being done within that group. These circumstances present an opportunity for Irish R&D, for although excellence in this area is still under development in Ireland, this is the case elsewhere as well, and we are able to work as equals in this area in Europe.

Conclusion and Recommendation

Wind energy is central to Ireland’s energy future, and should be a part of our national Energy Research Strategy. Small and medium size wind turbine R&D has languished world-wide due to the limited market for such technology, but it is clear that there will be a big expansion in this market over the coming decade, and Ireland can develop its wind technology expertise in this area to be the equal of other countries. **R&D in the area of Small and Medium Size Wind Turbine Technology should be added as the sixth “Sector Specific Field” in the Energy Research Strategy.**

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