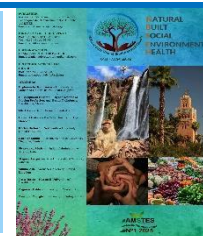




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EDITORIAL

The Winds of Change

The interdependence of human, animal and plant societies makes environmental problems. Many have technological / technical fixes. For example, the contemporary windmill, i.e., the wind turbine mounted on a tall structure (a tower) in a windy area, on land or offshore.

The oldest wind turbine – Tvindkraft in Jutland, Denmark – has worked for 43 years only, since 1978 [1]. It has not been subject to the rigours of full operating capacity because, though designed for 2 MW, it has mostly operated at 1 MW. Since 43 years - a brief period - may be seen as the total history of modern wind power, there is a great deal which may yet have to be discovered if wind turbines are to become fully alternative sources to thermal power stations or nuclear power stations.

Wind is, like solar energy, intermittent. The presumption of a modern society, at whatever stage of development it may be, is that energy will be available on demand. A presumption of luxury! Nuclear power can meet this demand, but Germany has given up nuclear power and Australia, though possessing uranium, has chosen not to use it. Nuclear wastes remain a serious problem because of the enormous timescale which must be envisaged for their storage and the many problems with guaranteeing security of the stored materials and their isolation from the environment. The solution proposed by Ringwood - Synroc - has been applied in one notable case [1,2].

Accordingly, wind, solar, wave, hydro, and geothermal power have to be considered if we are serious about confronting the problem caused by fossil fuels in continuing the dangerous trend of global heating. One awkward fact is that systems based on all the energy sources (and the luxurious presumption that energy will be available on demand) have limitations.

Wind turbines have generator components produced by China. This means that with a West vs East or bipolar view of international relations wind power is not secure and autonomous. Wind power also produces problems of costly infrastructure. The disposal of turbine blades at end of life is not simple, although repurposing and reuse is possible.

The school community of Tvind took the initiative to show to Denmark (and beyond) that the harnessed power of wind was a practical way to secure energy resources for socio-economic purposes. The current use of wind power thus depends on less time than the knowledge we have about aeroplanes and motor cars. Wind turbines may be designed for a 25-year maximum. But that seems as inadequate as designing a contemporary house in Great Britain for a maximum life of 60 years.

The electronics in the turbine's control box need better protection against humidity and it may now be time to redesign the system. Motor cars have been modified over the century in which they have been widespread, even to the main body work and the motive power supply. The electric vehicle is greatly different from earlier petrol or diesel vehicles and gives far better service.

It would be a good idea to stimulate universities and even secondary schools with an engineering focus to develop projects in improved wind turbines. They might consider the problems of a vertical structure confronting various wind speeds and turbulence intensities. Perhaps a project can be devised to consider siting a wind turbine offshore, to supply Agadir and environs. What is known of the probable load of the ocean's waves against the necessary foundations and related components? What is known of erosion and corrosion factors? How likely would be fatigue failure in the blades? What sites can be considered suitable for a prospective analysis?

This kind of investigation seems sensible because of the general demand of any developing society for more energy. The needs of the EU for alternative energies have increased since the Russian invasion of Ukraine led to the loss of assured supplies of Russian gas or oil and the increased cost of living for Europeans.

North Africa is already linked to the EU. The supply of energy across the Mediterranean to Southern Europe could be possible with well-established long distance power supply technology. And then there is bladeless small wind energy by vibration [3].

The real innovation is in the thinking!

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