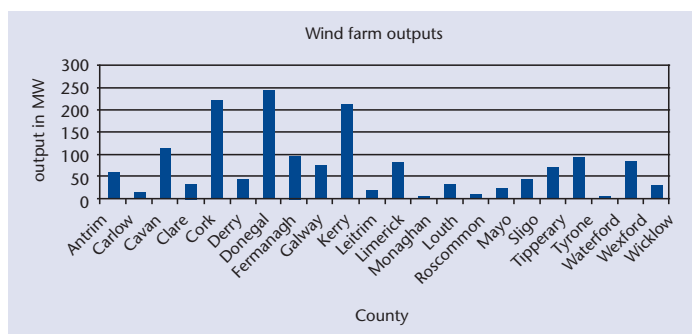


Can maths blow energy away?



Mathematics and applied mathematics are used in everyday life. Stock markets, mobile phones, car manufacturing, Google, Hollywood special effects, digital TV and satellites all use cutting-edge mathematics tools in their basic functions. The Mathematical Modelling Series presents a number of applications of mathematics in domains as varied as the human body, volcanology, telecommunications or finance.

The Government has committed itself to reducing the country's carbon footprint, and one of the ways they are looking to do this is by increasing the electricity produced by wind energy. Wind energy is a very attractive source of energy as it is cheap and renewable. However, the problem with wind energy is that it is not always available. If the country is going to have large-scale electricity production via wind energy, then this problem of availability must be solved. Mathematics can help to find the solution.



How it works

Ireland produces electricity from many different sources. Traditionally, fossil fuels provided the fuel power to run electricity turbines. Fossil fuels are not kind to the environment but, more importantly, they are also running out. Wind energy provides a much cleaner source of energy and is much more sustainable (see

figure of wind farm outputs in Ireland on above). However, it will be very difficult to rely on wind energy for producing all our electricity for reasons already stated. To combat this, Ireland will have to develop a system to combine the traditional fossil fuels (i.e., oil and coal) with wind energy to produce its electricity. Mathematics can help to develop this. There is a range of data available telling us the wind levels in Ireland over the past number of decades. Statistics can be used to study this data and find out the probability on a given day of having a certain wind level. This can then be used by electricity producers to plan how much electricity can be generated by wind energy on that day. If it's not enough, then the traditional coal and oil can be used to generate the necessary electricity.

Conclusion

While Ireland will still have some dependence on fossil fuels to generate electricity, using mathematics to obtain accurate probabilities of future wind levels can help electricity producers to incorporate wind energy into the system.

Parts of the curriculum used in this project:

- Statistics
- Probability
- Geometry, volumes and areas
- Newton's second law
- Energy conservation
- Ordinary differential equations

ACKNOWLEDGEMENTS AND MORE INFORMATION

This research is supported by the Mathematics Application Consortium for Science and Industry (MACSI) funded by the Science Foundation Ireland Mathematics Initiative Grant 06/MI/005.

If you want more information about MACSI and this project:

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