Noise research to combat 'wind turbine syndrome'

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Researchers are investigating noise generated by wind farms. Photo by Steve Ford Elliott

(PhysOrg.com) -- University of Adelaide acoustics researchers are investigating the causes of wind turbine noise with the aim of making them quieter and solving 'wind turbine syndrome'.

They are also developing a computer model to predict the noise output from wind farms so they can accurately and quickly assess the effectiveness of potential noise-reducing designs and control methods.

Research leader Dr Con Doolan, of the University's School of Mechanical Engineering, said the noise generated from wind turbines is 'trailing edge or airfoil noise', the same sort of noise generated at the edge of aircraft wings.

"We know generally what causes that noise - as the turbulent air flows over the sharp edge of the blade it radiates sound much more efficiently, so the noise can be heard at some distance," said Dr Doolan.

"What we don't yet understand, however, is exactly how that turbulence and blade edge, or boundary layer, interact and how that makes the noise louder.

"If we can understand this fundamental science, we can then look at ways of controlling the noise, through changing the shape of the rotor blades or using active control devices at the blade edges to disrupt the pattern of turbulence and so reduce the noise."

Dr Doolan said further complicating factors came from the effects of multiple wind turbines together and the way the noise increases and decreases as the blades rotate - the blade 'swish'. The model they are developing will look at the noise from the whole wind turbine and how multiple numbers of wind turbines together, as in a wind farm, generate noise.

"Wind turbine noise is very directional. Someone living at the base might not have a problem but two kilometres away, it might be keeping them awake at night," he said.

"Likewise this broadband 'hissing' noise modulates up and down as the blades rotate and we think that's what makes it so annoying," he said.

"Wind turbine noise is controversial but there's no doubt that there is noise and that it seems to be more annoying than other types of noise at the same level. Finding ways of controlling and reducing this noise will help us make the most of this very effective means of generating large amounts of electricity with next to zero carbon emissions."

Provided by University of Adelaide