

# Renewable Energy Systems

Customer Success Story

Autodesk Civil 3D



## Renewable Energy Systems Harnesses the Power of Autodesk Civil 3D

### Software halves the time taken to design wind farm access roads

*"...we are now looking at larger commercial projects as well as developing our residential portfolio. The way ADT has increased our productivity has played a key role in this."*

**Michael Whitbread**, RES CAD Manager.

One of the world's leading wind energy companies, Renewable Energy Systems Ltd (RES Ltd), certainly acts on what it believes.

Over the past few years it has transformed an old egg farm at Kings Langley, Hertfordshire, UK into an impressive head office. The farm is now a model of eco-friendly design.

The building itself is made totally from sustainable materials, all its energy is provided entirely from on-site renewable energy sources and parts of the roof are clothed with turf to provide extra insulation. There is even a visitors' centre to show the local community, including schoolchildren, all about the building and all aspects of the company's work.

RES' policy of using the most efficient - and therefore less wasteful - methods possible extends across the operation. For example, the company uses the latest Autodesk technology to help design the access roads on its wind farms in the most effective way. In fact, it says that using Autodesk Civil 3D has saved it around 50% of time compared to its previous methods.

### Cost-effective energy

The power produced by onshore wind farms is one of the cheapest forms of renewable energy available today. To date, around 50,000MW of wind energy capacity has been installed across the world, generating around 100TWh of electricity annually and employ 100,000 people.

The UK government has committed itself to ensuring that 10% of the country's electricity is generated from renewable sources by 2010 and in the UK alone there are currently around 110 wind farms. These comprise 1317 turbines, with a total installed capacity of 1090MW - enough to provide power for over 600,000 homes and reduce CO<sub>2</sub> emissions by nearly 2.5 million tonnes per year.

RES' contribution to this is extensive. In fact, the company is a global success story developing, building and running wind farms across three continents.

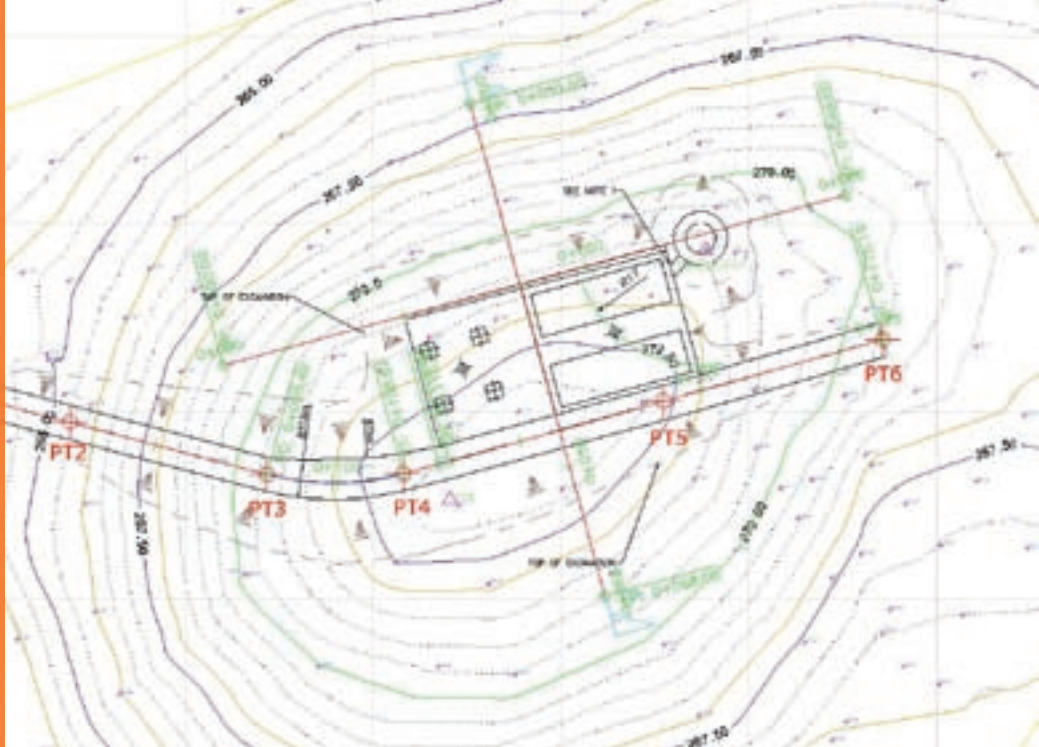
RES CAD manager Michael Whitbread describes how planning conditions for wind farms are becoming tighter. "Surveys have shown that wind power has overwhelming public support - planners naturally have to be careful and take many factors into account," he explains.

As a result, the three-person Kings Langley based team designing the infrastructure of the sites, needed to be able to analyse and interrogate their designs in more detail. This was particularly the case when creating the layout of the site such as the roads - often upgraded from farm tracks - to allow turbine delivery vehicles to get to the actual turbine locations.

Autodesk®

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**Michael Whitbread**, RES CAD Manager.

The company had always been an Autodesk user. The infrastructure team was using a combination of Autodesk Land Desktop and AutoCAD and the large technical department use Autodesk Map. Therefore it was a logical step to investigate Autodesk's new solution especially designed for civil work – Autodesk Civil 3D.

*"We have always used Autodesk technology and felt confident working with Allied Integrated Technologies Ltd ('ait') and Computer Aided Business Systems Ltd (CABS), both Autodesk resellers, to migrate to the new product,"* says Whitbread.

Now the team is able to bring in a topographical survey of the site into Civil 3D and produce a surface from this. They then enter the initial planning layout for the tracks and the location of the turbines, putting these in as alignments. This then enables them check the gradients.

*"Gradients are crucial – especially as, by the very nature of wind farms, they are almost always in remote locations and on steep, hilly sites. The manufacturers set a maximum slope so they are physically able to get the turbines up on the sites,"* says Whitbread.

*"If we are above the permissible limit, we have to re-design the layout of the track. This used to be very time consuming as you would have to do it section by section and then testing to see if it was too steep.*

*"Now, using Civil 3D there's an active link between the section and the planned views with the alignments. All you need to do is drag the alignment around it and everything related changes accordingly.*

Civil 3D's powerful dynamic engineering model means that changes made in one place are reflected instantly throughout the entire project. Design elements, visualisations, analyses and plans stay in perfect synchronisation so that changes can be made quickly while, at the same time, accuracy is maintained.

*"I would say because the technology recalculates everything automatically, the whole exercise takes only half the time it did before,"* he adds.

Whitbread explains that because of the success of using Civil 3D on the roads, the team is gradually extending its use. For example, it has recently started using it for the design of the crane hard-standing area adjacent to the wind generator which acts as a flat base for the crane to lift it into place.

*"We've developed various assemblies and alignments so that if we have to change the design, the base for the crane and the access road are all revised together accordingly,"* he says. The use of Civil 3D has also spread to the technical department which is using its Map function to help the analysis of windflow.

It is clear that RES is always looking forward to finding new ways to make its operation more efficient and productive by using the best technology available. It seems inevitable, therefore, that it will further its use of Civil 3D as time goes on. Meanwhile, its current achievements are no mean feat.

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Philip Madeley of 'ait' says that RES is one of a growing number of forward-looking companies who are discovering the benefits of working this way: *"The productivity advantages of 3D modelling for civil engineers are becoming increasingly apparent and we predict that it could change the face of the industry as we know it."*

Fraser Bateman of CABS agrees: *"Because the software makes it easy to change alignments it enables users to optimise their designs, making the best use of space and resources. At the same time, they are able to work faster – it's a winning combination."*

