

COMPANY

National Grid

CONSULTANCY

SLR Consulting

LOCATION

United Kingdom

SOFTWARE

Autodesk® InfraWorks®
Autodesk® 3ds Max®

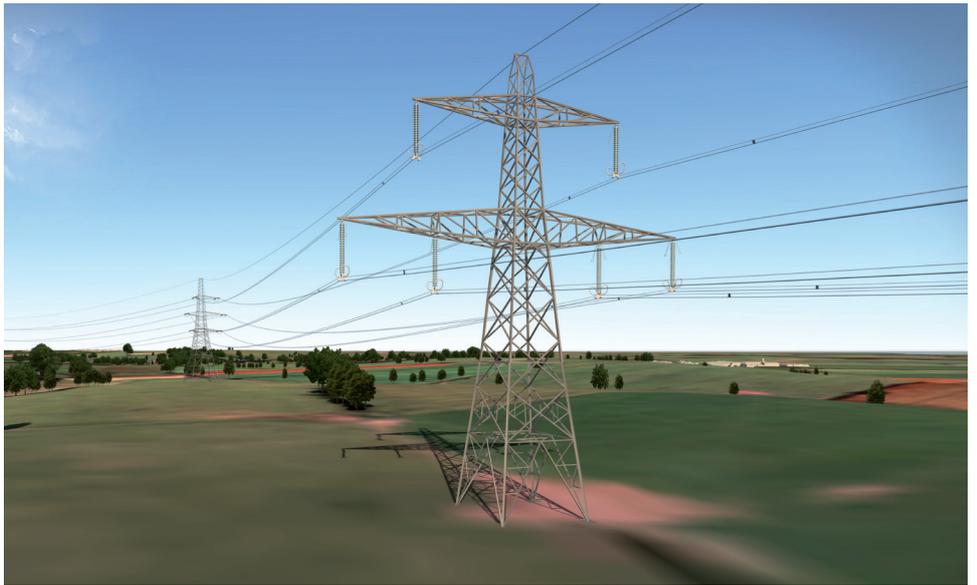
SLR Consulting takes on significant virtual reality project for National Grid

Consultancy looks to Autodesk to help build model of 6,000 km² area

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When we came to export the models into the virtual-engine, we saw even more added efficiencies. It usually takes us five days to manually place each pylon in the correct location in the terrain and string them together, but the intuitive nature of the software means we can now create a string of 100 pylons in just a day, leading to 80% in time savings.”

– **Kevin Smith**
Principal – CAD & GIS
 SLR Consulting



Proposed line route options modelled using Autodesk software. Image courtesy of SLR.

Ahead of the curve consultancy continues to evolve virtual reality

Global environmental consultancy, SLR Consulting, has been using visualisation in projects for over 20 years and prides itself on keeping up with the latest developments in virtual reality (VR) technology. One of the company’s latest projects with National Grid was its biggest virtual reality project to-date. It was tasked to accurately model an area of 6,000 km² in the Lake District which took two years to complete.

A visualisation heritage of 20 years

SLR Consulting is a leading international environmental and advisory consultancy, with a network of offices based in Europe, North America, Asia-Pacific and Africa. It offers over 30 different advisory and consultancy services to clients in sectors such as infrastructure, power, and oil and gas. A service that the company has seen rapidly increase in recent years is the creation of VR models for projects before they are built.

The company was recently commissioned by National Grid to create its biggest VR project to-date: an interactive, virtual reality model

of a new power line in the Lake District. Although it had worked on previous VR projects with National Grid, nothing had been quite to this scale, spanning 164 kilometres in length and 6,000 kilometres in area. Whilst this commission was well under way National Grid engaged SLR to provide a VR model of another new power line in North Wales connecting the proposed Wylfa Power Station on Anglesey. This model was over 2,500km² and once again Autodesk products were the core tool used to model the components required.

The power firm wanted to create an immersive VR experience to demonstrate construction plans to members of the public, by allowing them to walk the full length of the proposed power line, from Carlisle to Morecambe Bay. Beyond using the VR model as a public engagement tool, it was also central to the design process, used by landscape architects to access on the best route for power lines leading from the new power station.

SLR had used Autodesk® 3ds Max® in previous virtualisation projects to create realistic models of objects, but because of the size of the Lake District project, decided

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to start using InfraWorks® to help model the landscape components. Data from both software packages could then be exported into the real-time engine used by SLR, Unity, which would host the final VR model.

“We have been championing VR for a couple of decades, before it was even coined VR. However, for this project we really needed to take the technology to the next level to manage the sheer scale and complexity of area. We’ve worked with Autodesk for over 20 years and knew it was making great inroads with VR, as well as AR, not just in terms of its software and compatibility, but also through partnership with HoloLens, which made it a natural choice for this project,” says Rob Myers, Visualisation and Virtual Reality Specialist, SLR Consulting.

The need for photo-realism brings complexities

The main challenge with the Lake District project was the size and complexity. It measured 6,000km² and needed a 10m buffer from the route corridor to accommodate views into the proposals. The team also had to ensure there were no glitches or lags in images during the virtual walk-throughs which required a digital terrain resolution of 5m. Added to this, not only did SLR need to include all landscape features in the area and proposed layout of the new power line, but they also had to take into consideration routes of other power suppliers feeding off National Grid.

For previous VR projects, the team manually created height maps for their landscape tiles before exporting them into VR. Knowing that this was too convoluted for this project, they looked to InfraWorks to build a more realistic model and help simplify and speed up the process. Using the software, SLR could easily import Ordnance Survey Integrated Transport Network (OS ITN) data to model a whole range of landscape features such as road systems, bridges, railways and buildings. Once they added this base information, the team could populate the InfraWorks model with even more detailed terrain and landform data using geographic information system (GIS), before exporting it into the real-time engine.

“The fact that InfraWorks is compatible with multiple data sets, such as OS and GIS, as well as different software packages like Unity, is invaluable. Through a few clicks of a button, we can create a detailed landscape that mirrors how it looks in real life, even down to the different lanes of dual carriage way.

“In previous projects, we spent around two days manually tracing and assigning roads, depending on the surface type, but with InfraWorks, we can generate and optimise



Existing windfarms modelled using Autodesk software. Image courtesy of SLR.

road surfaces in a couple of minutes. Not only does this speed up the process by a couple of days – we were able to cut the time by 50% – but it also makes the virtual model even more photo-realistic,” says Kevin Smith, Principal – CAD & GIS, SLR Consulting.

The team also used 3ds Max to further improve efficiencies within the project. They created realistic models of the various pylon ‘families’ and substation components in isolation and saved it into a product library for future use. Once an initial model had been created, SLR could use the software to automate the placing of pylons. Traditionally, SLR manually placed models in the scene before stringing them together, which usually took around five days to complete. Now the team can position and string together 100 pylons in just a day, with additional checks on top.

Commenting further, Smith adds: “We were able to reduce the time spent on modelling by 90% in some instances. For example, modelling a pylon family only took one day instead of 10. When we came to export the models into the virtual-engine, we saw even more added efficiencies. It usually takes us five days to manually place each pylon in the correct location in the terrain and string them together, but the intuitive nature of the software means we can now create a string of 100 pylons in just a day, leading to 80% in time savings.”

Alongside the virtual model, SLR used 3ds Max to deliver further value to the client by producing a series of 180 degree photomontages that could be used by National Grid in presentations to provide even more detail on the project.

Smith continues, “Although we do use other software in the company, Autodesk is our main product supplier and I’m a keen advocate of it. It talks to many different packages, which means we can rely on it in projects such as this where we need to collaborate across tools. We have also found the support network from Autodesk to be invaluable. We can easily access tutorials and advice through online forums, which helps us get to grips with new features or entirely new tools such as InfraWorks.”

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Staying ahead of the virtual reality curve

Since SLR completed the model, National Grid has gone on to host engagement sessions with the public, using the virtual walkthrough to gain feedback on plans and inform required changes before the construction of the new power station and power lines starts.

Commenting further, Robert Powell, NWCC Project Manager, at National Grid said, “The virtual reality units assist us significantly at our consultation events. They are continuously in use and for most people they set minds at rest. For many the model clearly illustrates the scale of the project, which is helpful in itself. SLR’s work on the model has also helped me personally understand the project at a more detailed level.”

Now that SLR know they can confidently create a virtual model encompassing such a large area and with a vast amount of detail and data, the team are looking forward to working on additional large-scale infrastructure projects where they can develop their VR skillset even more.

Looking to the future, Myers said, “Businesses and their clients really value being able to see what completed projects will look like in a real-world environment, and so we believe the VR and AR market will grow rapidly. Through the Lake District project, we now have a visual asset from a prestigious company, which we can use to demonstrate to prospective clients our capabilities. We are determined to lead the way in VR and AR and know if our teams are using Autodesk, we will stay ahead of the curve.”