

Renewable energy consultants

GL Garrad Hassan



More Efficient Wind Farm Layout for Best Financial Return

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www.gl-garradhassan.com

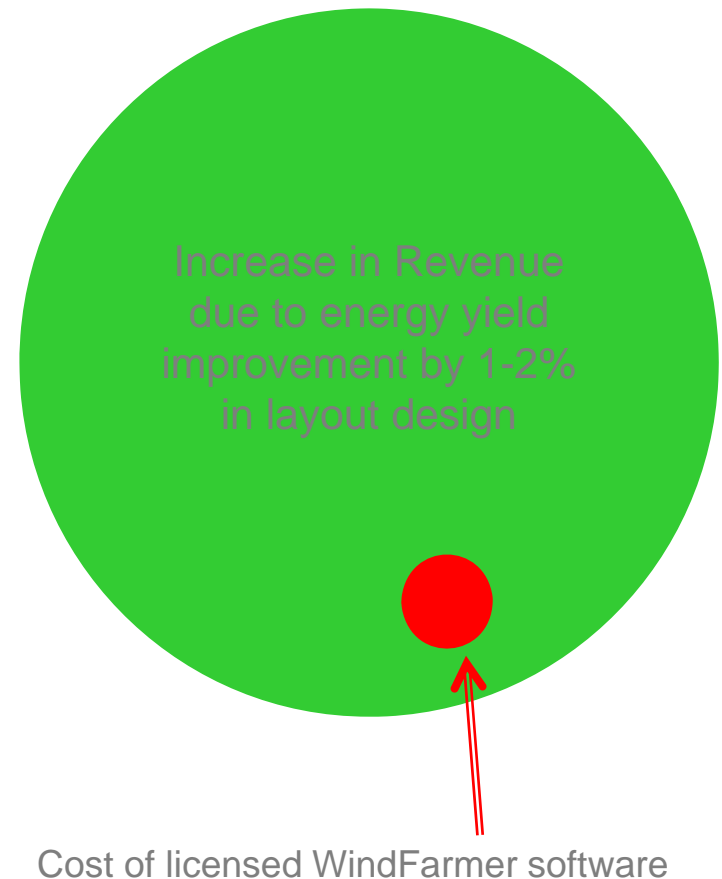


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Significance of Using GL Garrad Hassan : WindFarmer Software

- Assume a hypothetical site – a 50MW wind power project in Madhya Pradesh
- 50MW project can be expected to generate 3,500 GWh over its life time
- 3,500 GWh corresponds to an income of ~3400 crore INR
- A 1% improvement in the energy output due to a superior optimisation will therefore increase revenue by ~34 crore INR
- This is 250-300 times the cost of WindFarmer
- A small investment in WindFarmer Software will pay for itself many times over.



WindFarmer Software



Wind Farm Project Life cycles



Site Feasibility Studies



Owner/Operator



Investors/Lenders

Project Developers

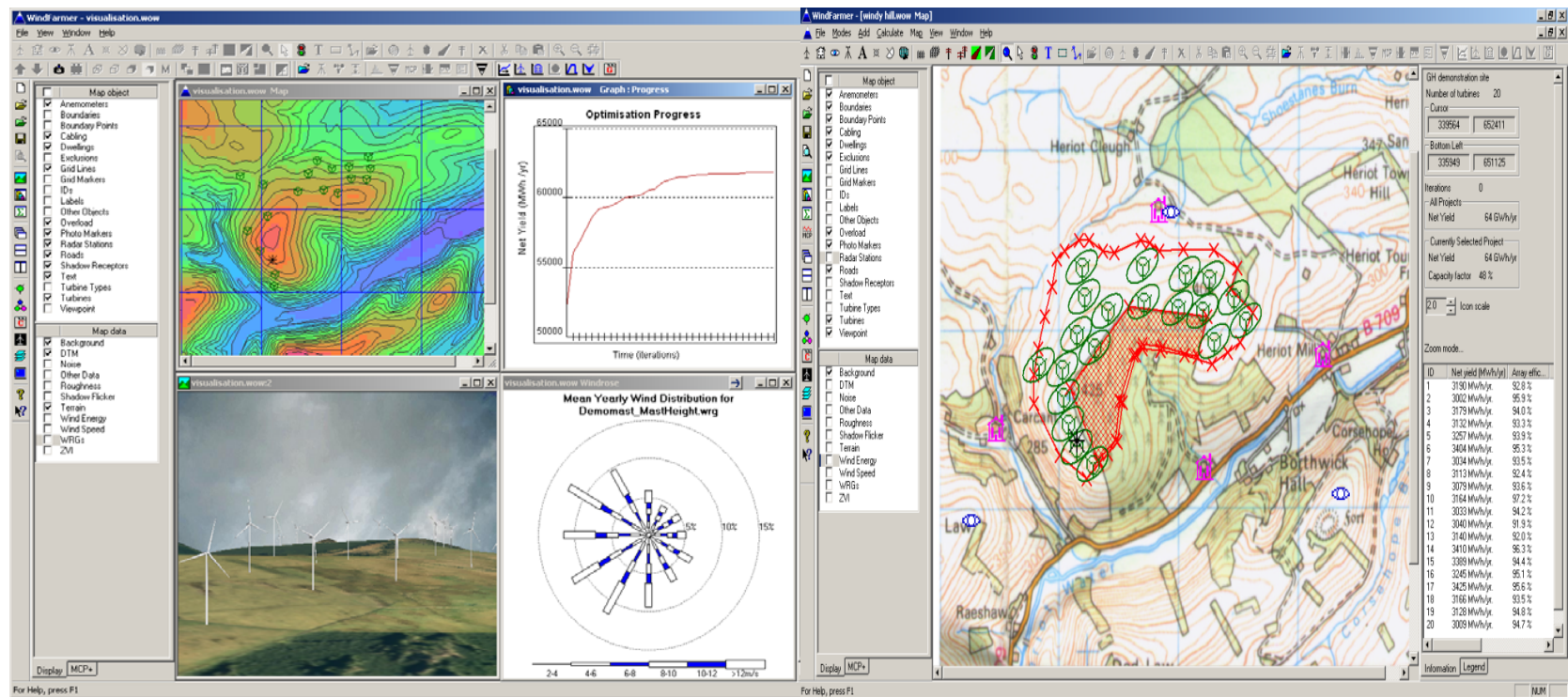


Manufactures

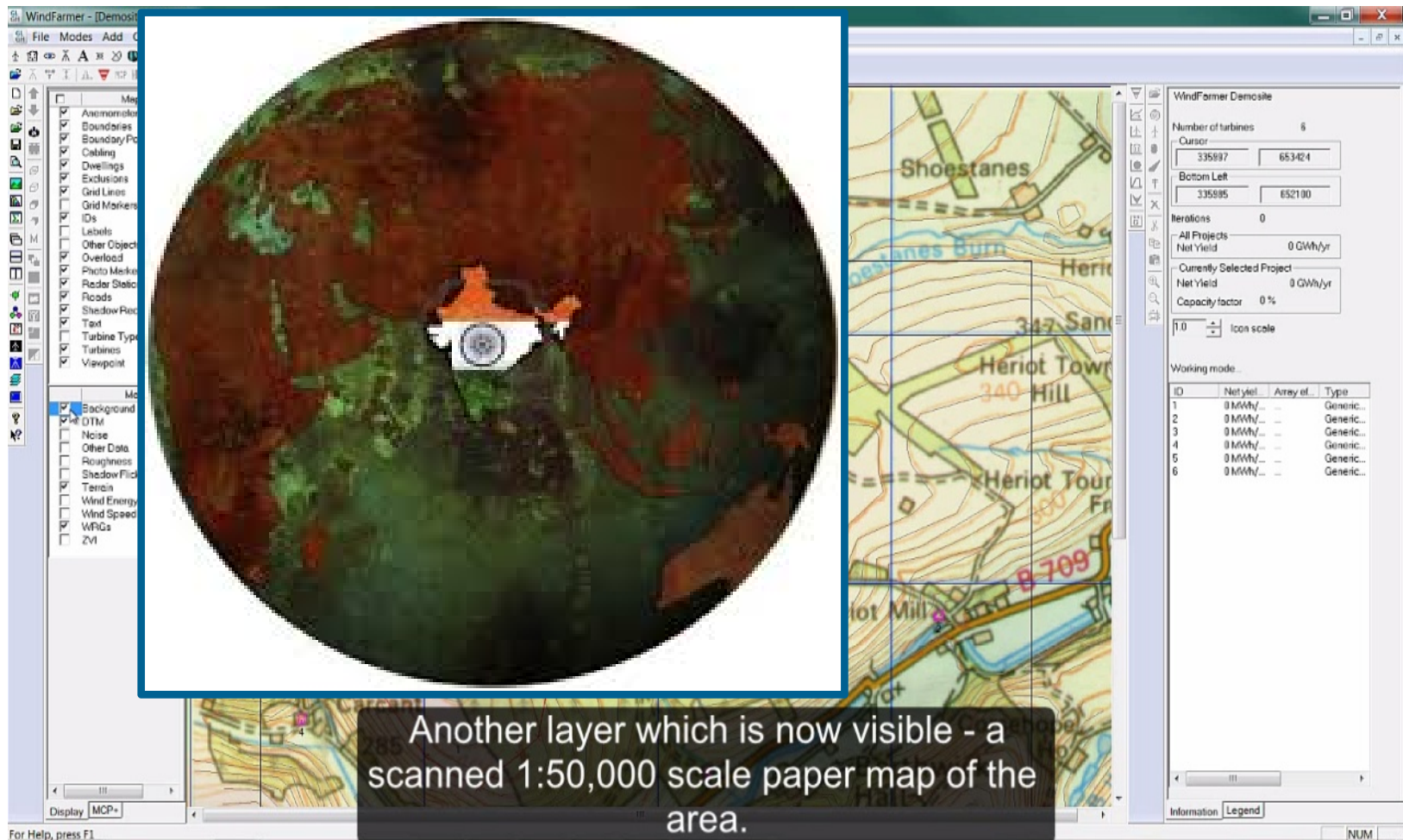


WindFarmer Energy Calculation

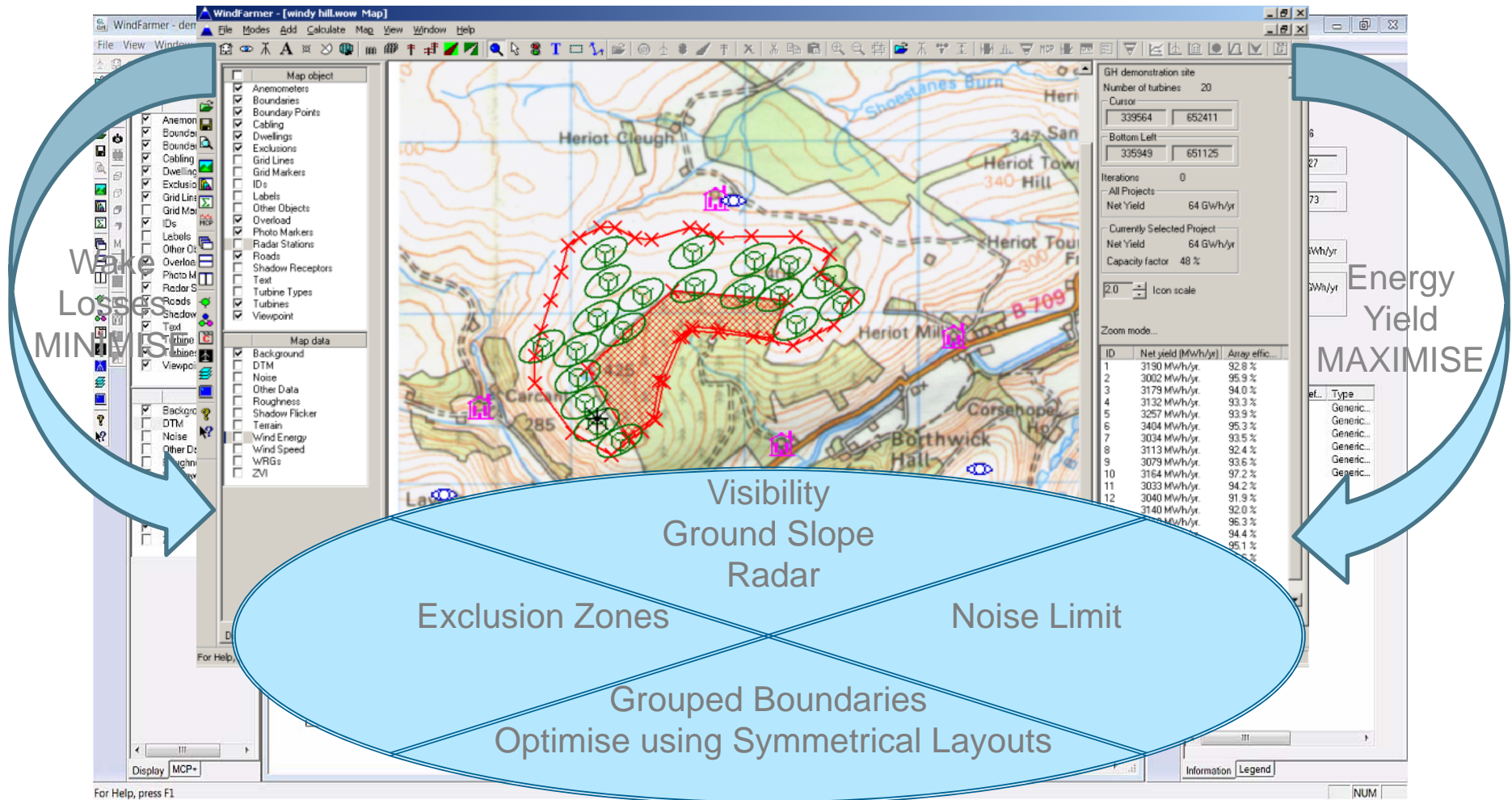
Calculate the Energy yield with a detailed breakdown of results



Online GIS Data Support



WindFarmer Optimiser

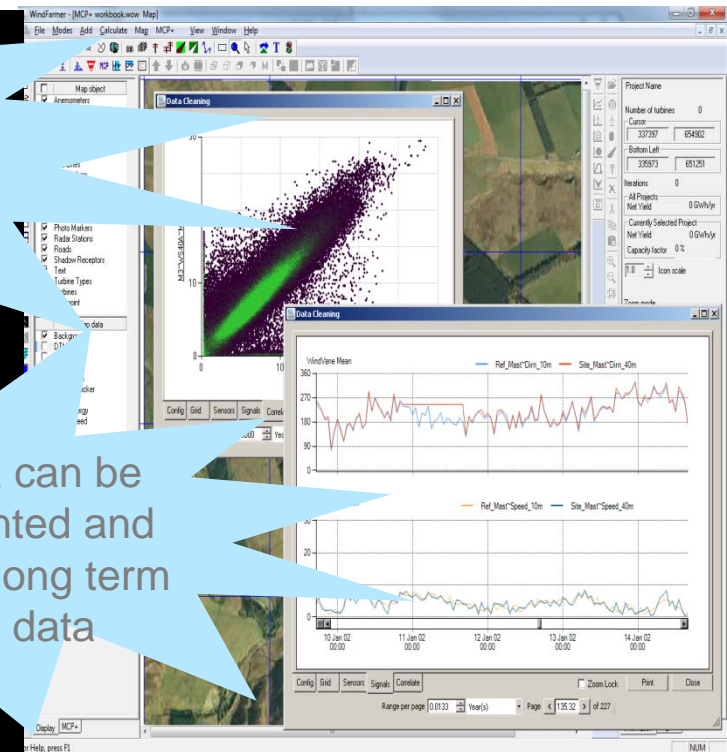


MCP+ Module

- Load and Recalibrate any and every logger channel
- Inspect and exclude unwanted data and examine the plots
- To check you have the best statistics

MCP+ module provides you with all the tools you need for evaluation of your measured wind data

Time series data can be cleaned documented and then corrected to long term wind resource data

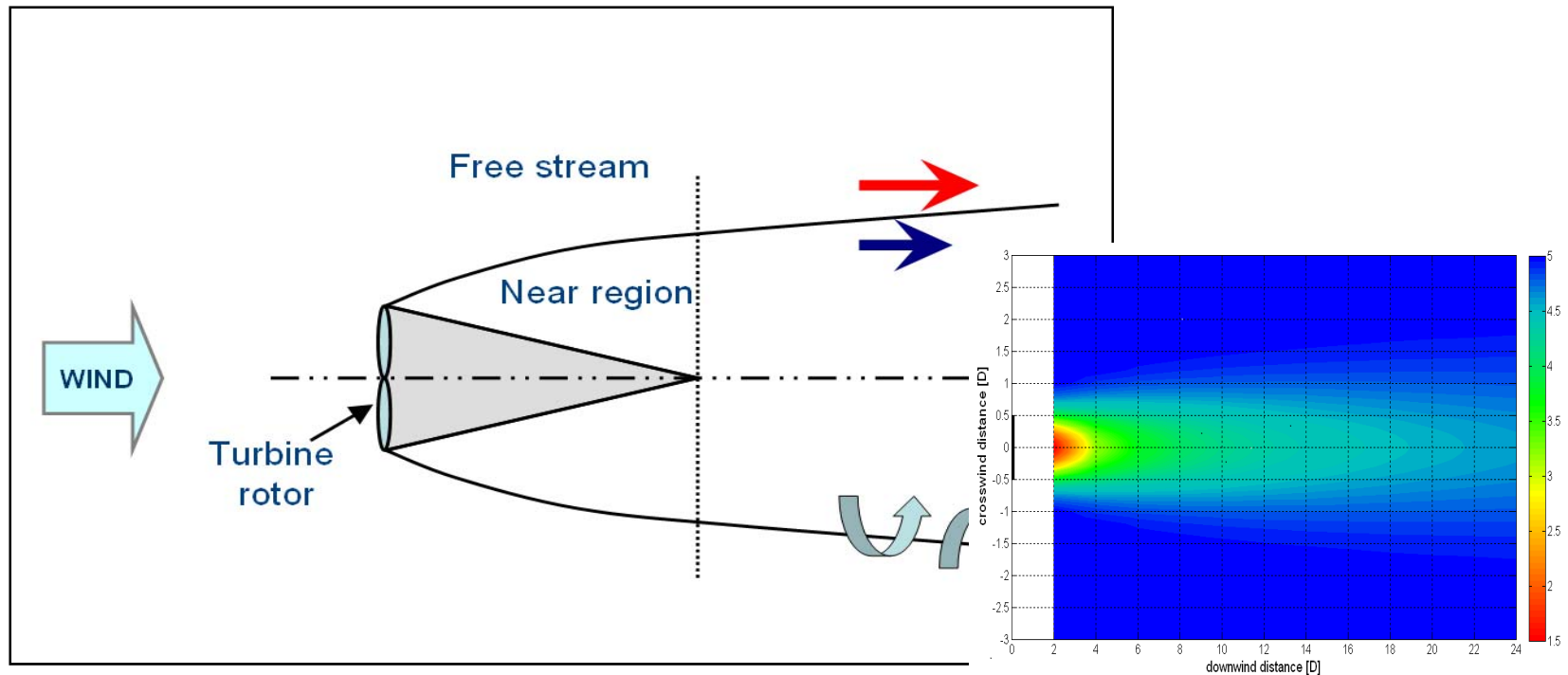


Wake Effects Calculation

Use wake models that include turbulence intensity

Suitable for complex terrain, mixed terrain and offshore

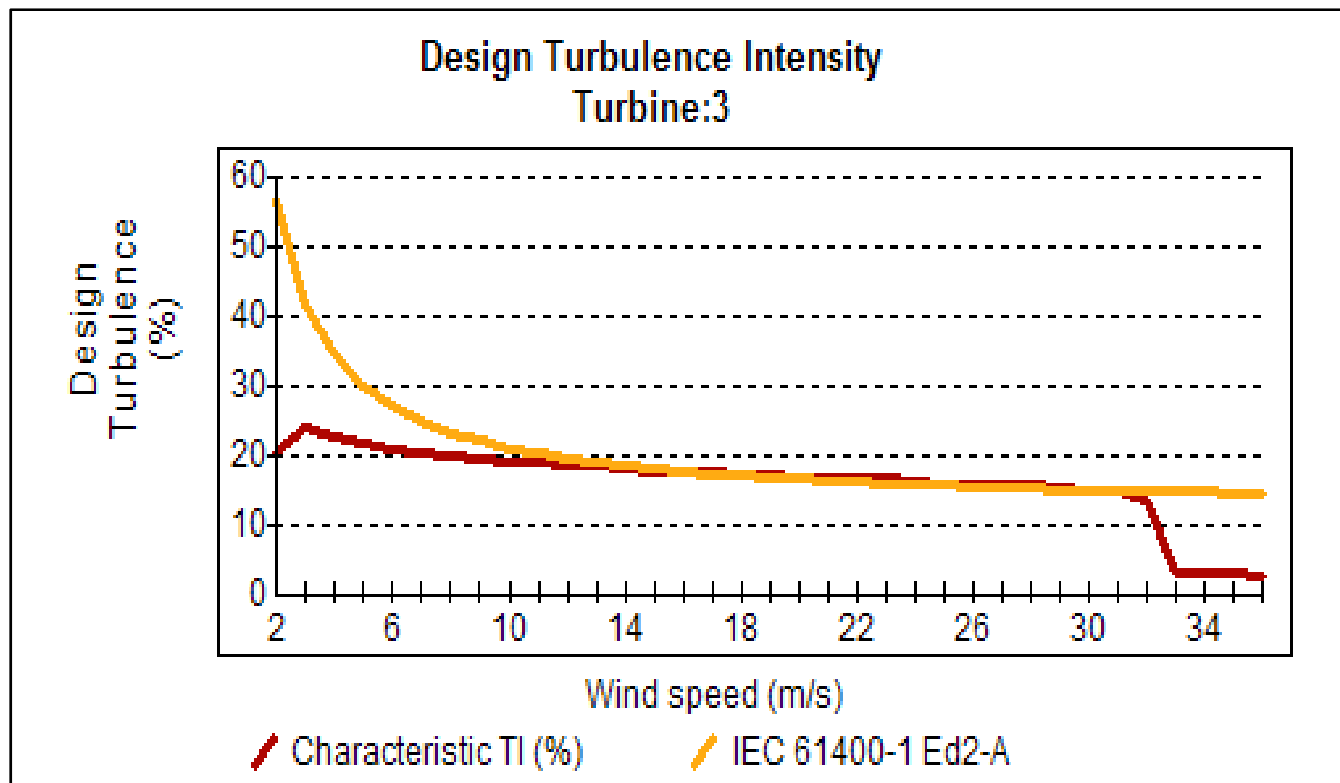
Select from a choice of industry leading wake models



Site Effect Assessment

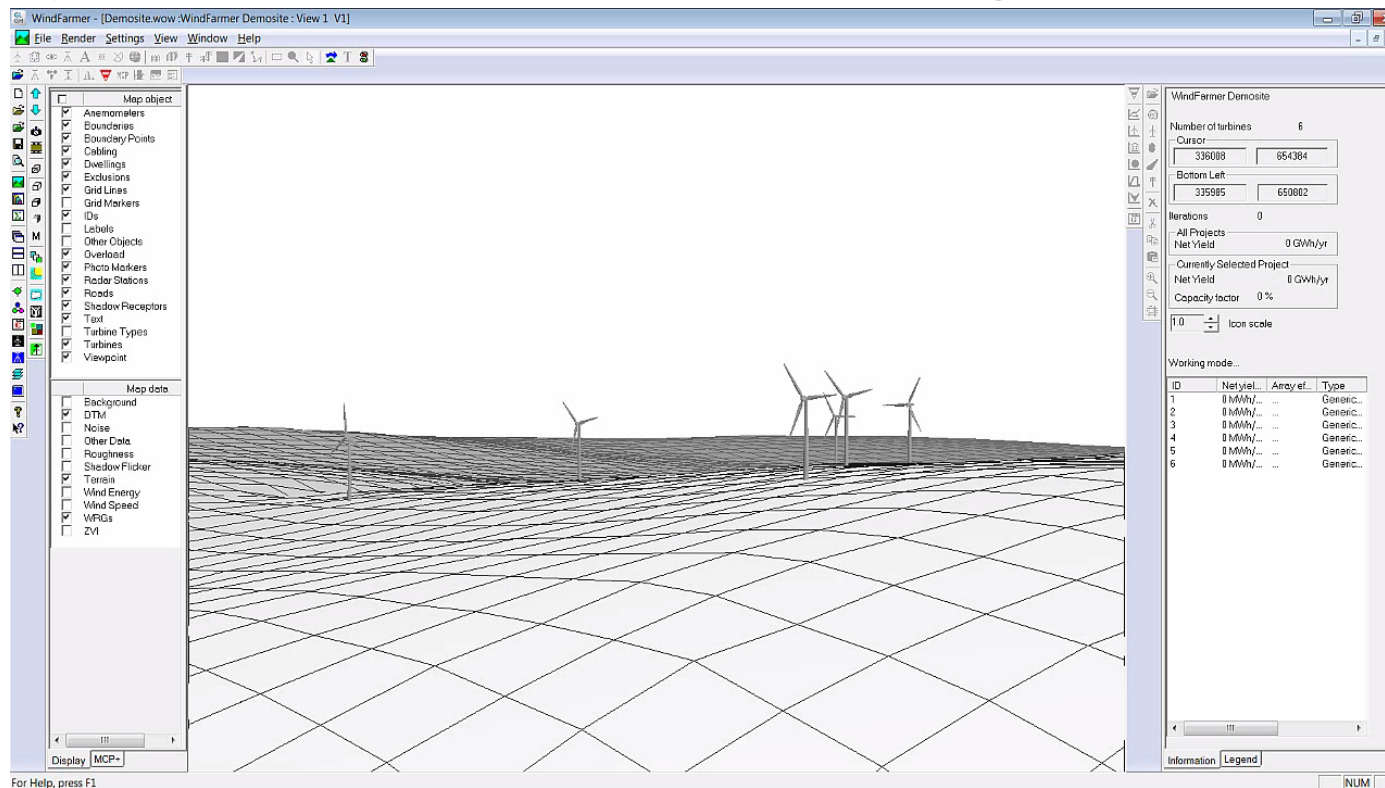
Design Equivalent Turbulence Intensity

Calculate to ensure that you have chosen turbine model is of a suitable IEC classification for the site.



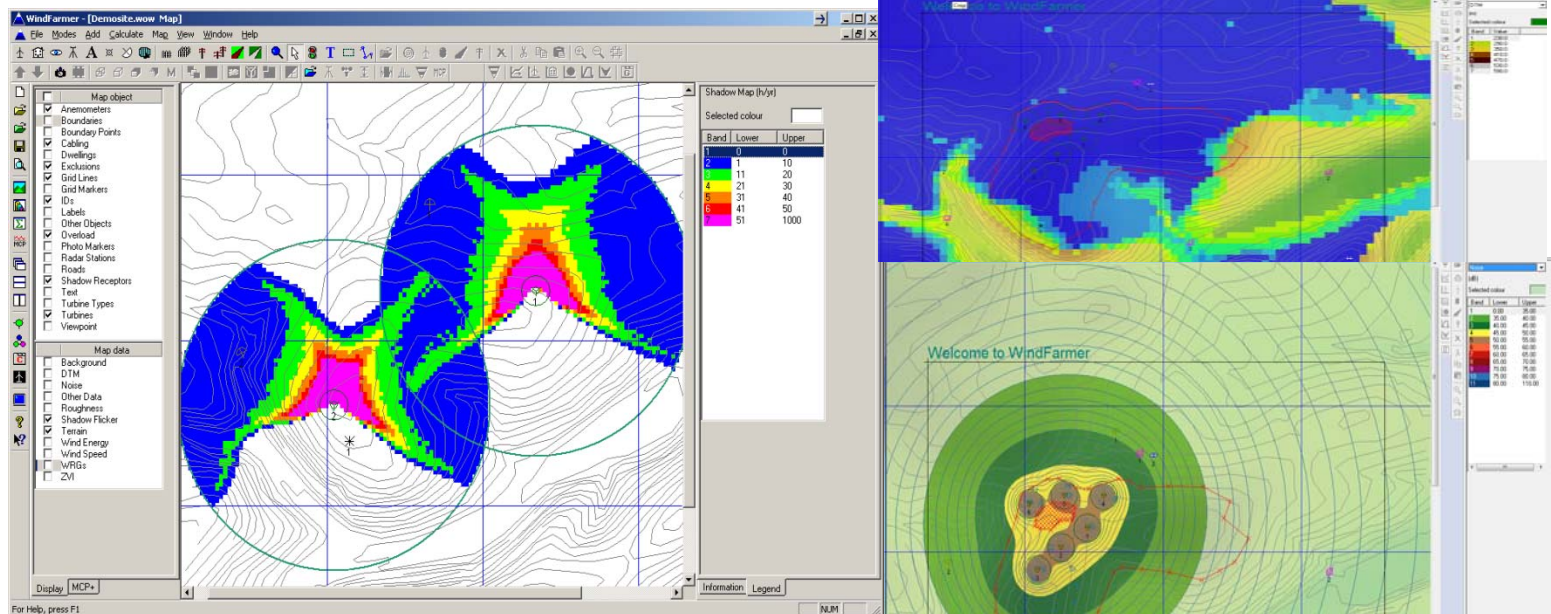
Real Feel of Wind Farm Design : Visualisation Module

Produce wireframes, photomontages and animations from any viewpoint
Import your own photos and Aerial images for a realistic impression of wind farm
And you can also export the finished wind farm to Google Earth



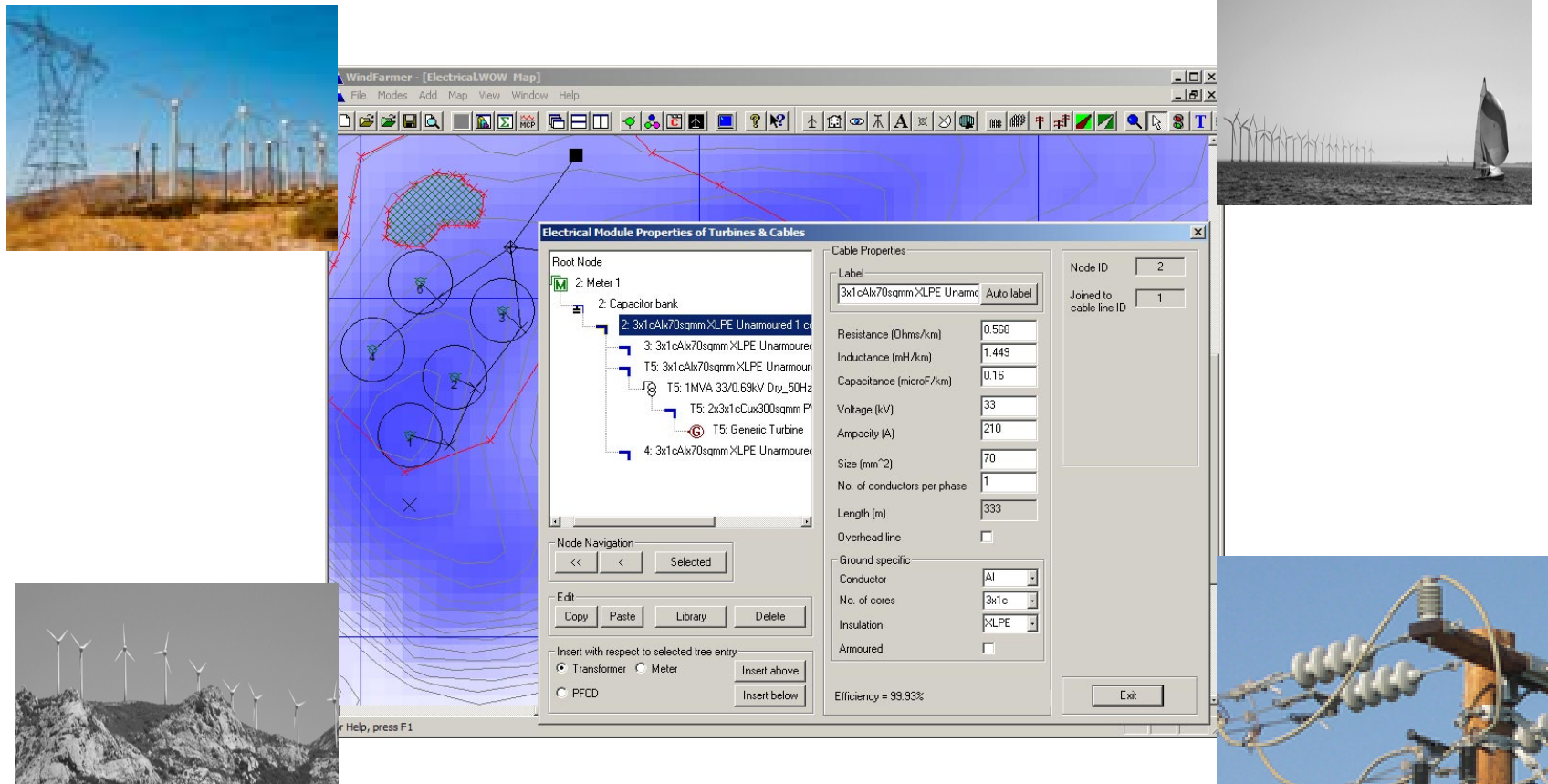
Environmental Impact

- Enter your environmental constraints into the optimizer and WindFarmer will search for the best turbine layout to satisfy those constraints to get the best energy yield for the site
- Create environment impact assessments model noise shadow flicker and zone of visual impact



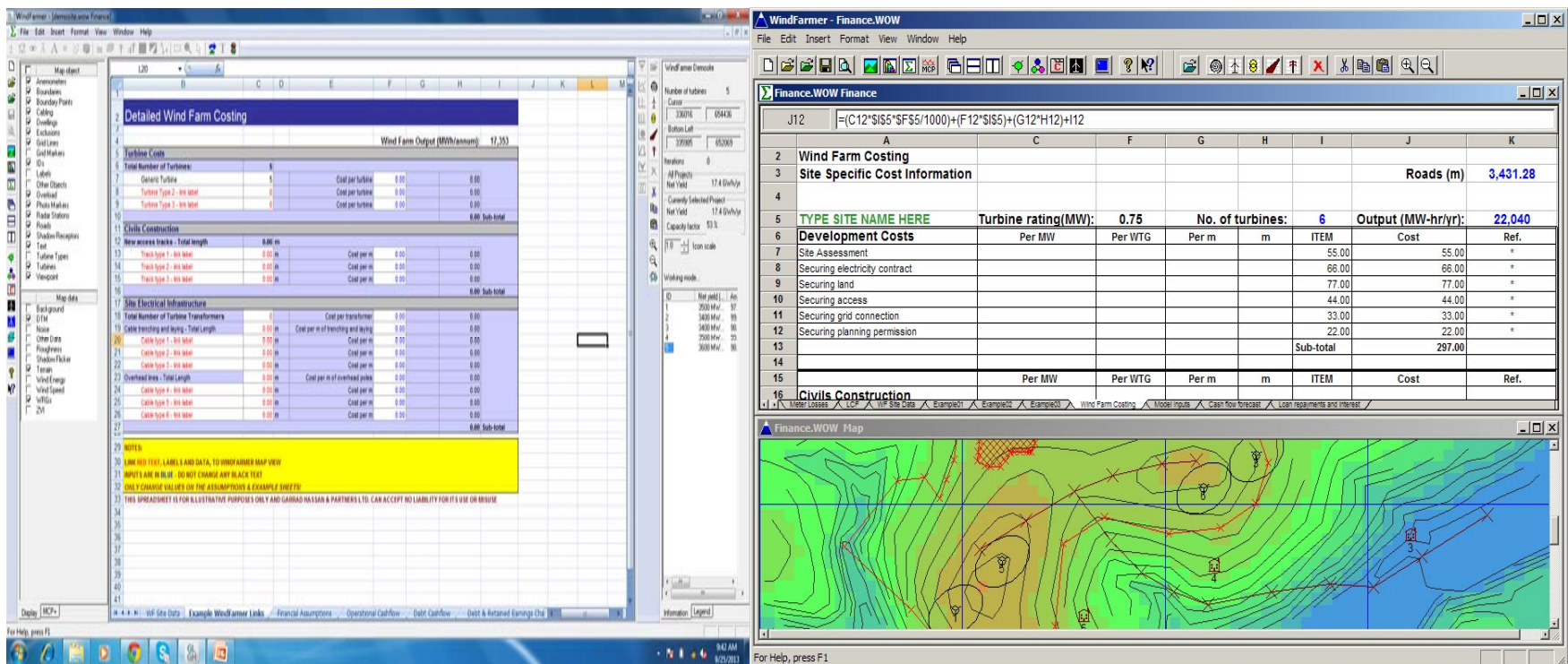
Electrical Layout

Design the electrical layout of the wind farm and test its performance.



Financial Calculation

Integrate a full financial appraisal of your project. Use the inbuilt cost model or import your own.



Benefit From Our Global Network



WindFarmer is used globally. The software, support, documentation and training are available in 12 different languages

Arabic, Chinese, English, French, German, Greek, Italian, Japanese, Polish, Portuguese, Spanish and Turkish.

Renewable energy professionals worldwide rely on GL Garrad Hassan's international training programme.

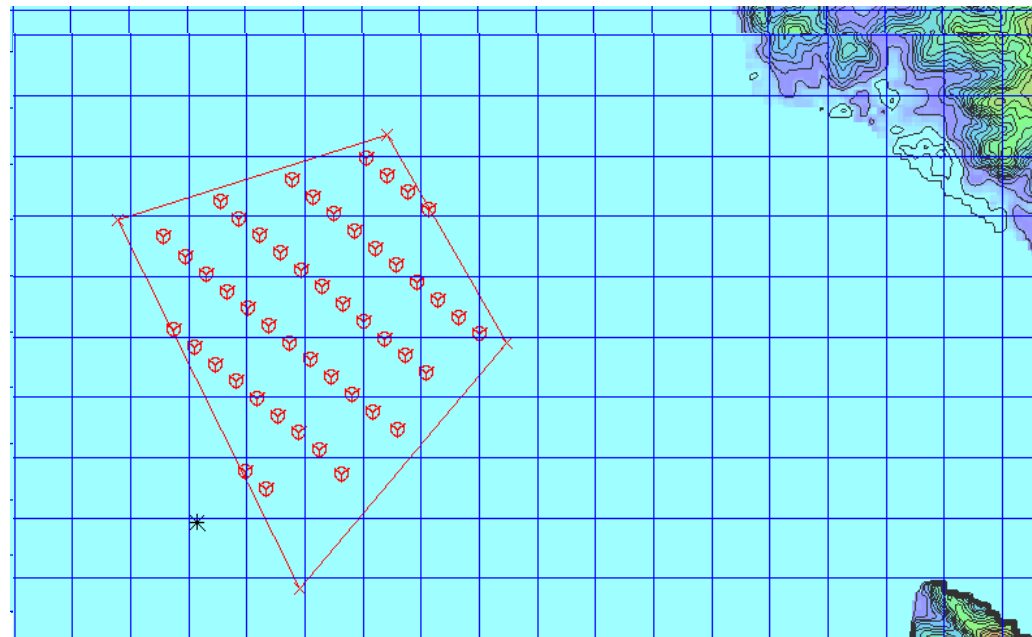
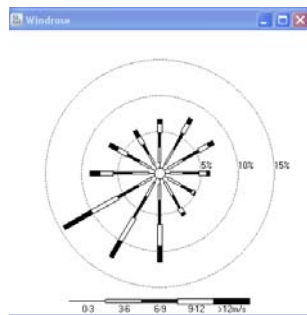
Courses are also tailored for groups of employees where clients have a bespoke requirement.

WindFarmer is supported locally by GL Garrad Hassan experts who know the market.



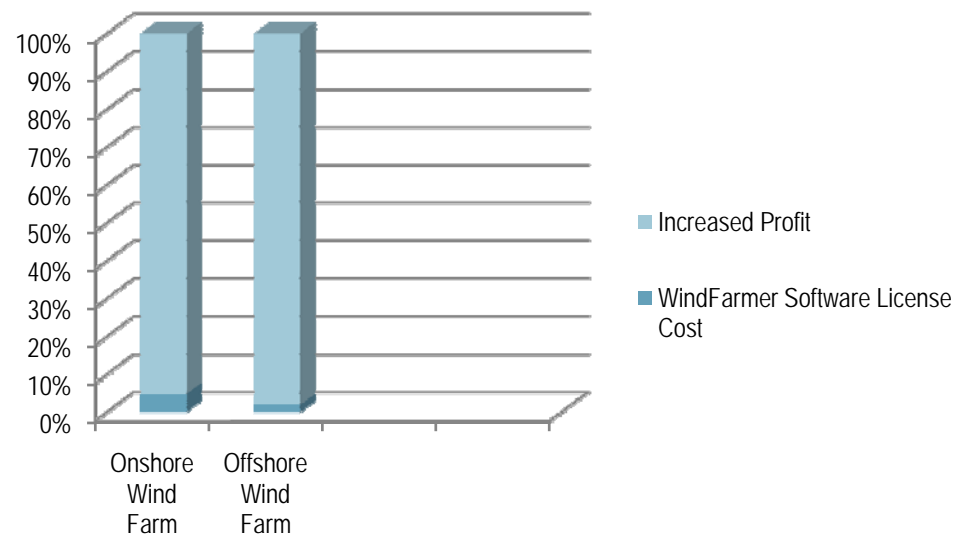
Value Added : Test Case

- Assume a hypothetical offshore site – a 100MW project, 50 turbines, 100m rotor diameter
- WindFarmer includes a special engine to optimize offshore layouts
- It considers spatial arrangements to improve navigation and then turbine access
- Starting from a random layout it checks the possible configurations to find the optimum



Value Added : Test Case - Conclusions

- 100 MW project can be expected to generate 7,000 GWh over its life time
- Also a minimum improvement of 1% in the energy output due to a superior optimisation will therefore increase revenue by 100 crore INR (assuming offshore incentive 50% higher than onshore one)
- A small investment in WindFarmer Software will pay for itself many times over.



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Thank you for watching

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