

Windfarms

Do you want to explore the feasibility of a wind generation project? Do you need a comprehensive plant design? Are you wondering how and where your wind farm can connect into the grid and how it will communicate with the outside world?

Problems

Whether you're an investor, generating company, equipment supplier or an installation contractor, any new wind generation project will present challenges. Wind farms are relatively complex and they're typically built in remote locations far from load centres. In addition, there are often consent and grid connection issues during the early stages of any project.

Estimating costs and establishing feasibility

To raise capital for a wind generation project, land owners, lenders and investors need to be confident the project will be profitable. Although the major equipment - such as the turbines - will make up most of the cost, there are many other factors to consider.

The following elements need to be factored into the overall cost estimate at the feasibility stage, then commissioned once the wind farm is given the go ahead.

Grid and communications connection

Wind farms are usually located in remote regions where there is minimal infrastructure. The cost of a new grid connection and associated communications can often make or break the project.



Responding to Transpower's wholesale supplier requirements

If the proposed installed capacity is more than 10MW (typically), the site's operator will need to bid on the wholesale market. This means the operator will need to connect to Transpower's communication network and adhere to the following requests.

- **Dispatch**

Staying within the maximum MW amount allowed to be generated in the next 30 minutes, based on demand. In the future this may include MVAR, power factor (pF) or voltage dispatch requirements

- **Constraint**

When there is surplus generation on the network

- **Grid emergency**

Responding to a major issue on the grid

The receipt of these requests needs to be acknowledged. Some parts can be automated, however if there is a grid emergency there may need to be manual intervention.

Co-ordinating protection with the rest of the network

The outgoing line or cable will need protection that coordinates with the rest of the network. The local utility's protection standards will normally apply. A new protection communications link may also be required.

Designing and installing earthing

Adequate earthing is required to ensure safe step and touch voltages during a fault or lightning strike.

Specifying, designing and integrating the balance of plant

A number of auxiliary systems are needed to make the wind farm operate. Turnkey suppliers and 'design-build' installation contractors require these systems to be specified, designed and integrated into the overall design.

Solutions

Feasibility studies

We can undertake feasibility studies covering issues such as the grid connection, protection issues, earthing requirements and communications. Our civil and structural partners can assist with geotechnical designs to ensure the potential site is suitable for building a new wind farm.

Grid connection

Early negotiations with the local power utility and an understanding of the regulatory requirements are essential to accurately estimate the cost of grid connection. It will also help resolve any potential issues before the project begins. We can help with estimations and liaise with other parties - such as local electrical utilities and Transpower - to develop the most cost effective approach. There may be opportunities for cost sharing if it benefits both parties.



Wholesale markets

To bid on the wholesale market and deal with the grid operator's requirements, you'll need 24-7 system monitoring. Where a network operations centre exists for the generating company this is not a major issue, as the infrastructure is already in place. However, for a smaller operation it may be cost effective to outsource this to a third party, such as the local utility's operations centre.

Protection

We will produce recommendations for protection of the outgoing power line and any primary plant within the site itself. Once the wind farm becomes a real project, we will produce the relay settings and help with commissioning.

Balance of plant

We have many years' experience producing balance of plant designs for large projects, in particular:

- Control room housing protection & control equipment
- Service and maintenance building
- Local substation or switchyard
- Line / cable protection, including associated communications infrastructure and remote ends
- DC systems
- SCADA
- Unit transformers

We can provide the designs to the principal client or lead contractors, depending on the contractual arrangements.

Industry experience

At Ergo we have many years' experience designing wind farm solutions for a range of clients.

About Ergo

Ergo is a specialist electrical engineering consultancy with two areas of focus – power systems and control systems. We provide services for high voltage, power generation, distribution, instrumentation, automation and process control for clients throughout New Zealand and Australia. Our excellent track record with major infrastructure and industry clients provides concrete evidence of our expertise, efficiency, accountability and care.



Interested? Contact us today

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