

Dear Ms Beausang and Mr Naughton

### **Wind Generation - System Security Issues**

I am writing on behalf of NGK Insulators, Ltd. in response to the Commission's request for views and comments on ESBNG's recent paper on wind generation connections to the transmission network.

It is agreed that wind generation is a relevant and necessary part of the generation portfolio. Wind generation has grown significantly in recent years, and it is likely that it will continue to dominate the additions to the renewable generation portfolio for many years to come. There have been many useful papers that describe the negative impact of large proportions of wind energy on the operation of a power network and some work has suggested that electrical energy storage may be an appropriate solution. As manufacturers of an advanced battery (the NAS battery) we would suggest that electrical energy storage be considered as an operational asset to alleviate problems of wind energy integration on power systems.

Battery energy storage can be used in several ways to improve the operation of the grid. It can be located throughout the network, as either a distributed or centralised resource. Battery systems are fast acting (with response times in the order of sub-cycle or cycle) and capable of ramping at loading rates faster than conventional types of generation.

There are several issues of concern for which batteries can mitigate, e.g.:

- fault ride through
- frequency control and regulation
- voltage control and regulation
- provision of adequate reserves
- dispatch and control of resources

For example, grid connected battery storage can be used to provide fault ride through, by injecting pulses into the system when required. Grid connected battery storage is able to provide and absorb real and reactive power on a continuous basis, ensuring that frequency and voltage is maintained. Voltage rise as well as dips can be accommodated. Batteries in standby mode can be ready to provide the whole range of reserves: fast acting reserves through to standby reserves and black start, thus reducing the need to maintain conventional plant in a standby state. In distribution applications, storage could be used to support islanding operations in extreme circumstances. Battery storage can also be used to smooth the production profile of wind (or other renewable generation) simplifying the dispatch of wind energy.

Battery storage is achievable now. There are many battery types and installations of sizes up to tens of MW in operation throughout the world. As an example, NGK Insulators, Ltd. have installed more than 20 projects rated at more than 1 MW, two of which are rated at 6 MW and 48 MWh. These projects demonstrate the technical reliability of the system.

Electrical energy storage is a multi functional tool and maximum benefit will be gained when it is sited to execute multiple applications and so profit from combined value streams. Owners and operators of wind generation will be seeking to reduce their capital costs, and insistence on

incorporating storage alongside wind generation may restrict the growth of wind generation. Further, there would need to be a full opening of the market for all ancillary services for owners of small storage plants to gain equal benefit to the larger operators. We therefore propose that storage is considered as part of the network resources. It should be treated as an asset by the TSO along with their inventory of transmission wires and transformers. This would ensure that adequate storage investment was made commensurate with the proportion of wind generation.

We would be happy to pass you more information about battery energy storage and our NAS battery in particular.

NGK INSULATORS LTD.