



## *Wind Farm Systems a Breeze for SEL*

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### **INTRODUCTION**

Utilities around the world specify SEL for the point of common connection because SEL has extensive experience working with wind generators and complete wind farm applications. Protection and control of wind energy have special considerations for protecting both the wind turbine and the utility connection. Additionally, safety must be maintained during normal operation and outage conditions. SEL experience and reliability keep wind turbines online and producing energy at optimum levels. Complete solutions provided by SEL include engineering, protection, control, equipment, buildings, and checkout. Some recent examples of SEL wind projects include the following:

- Old Trail Wind Farm – Twin Groves Substation
  - Complete substation project management
  - Protection and control equipment, including control building
- Oak Creek Energy wind turbine tie to Southern California Edison
  - Small generator tie to grid
  - Innovative recloser application
- Windemuller – Stoney Corners Wind Farm
  - Complete substation project management
  - Protection and control equipment, including control building
- Comisión Federal de Electricidad – La Venta II wind project
  - Complete substation project management
  - Multivendor IEC 61850 application

### **CHALLENGE OF NEW POWER SOURCES**

Most power distribution systems are not designed for generation to be connected on the radial feeders. Installation of wind turbines connected to the utility grid requires a full understanding of both systems. The point of common connection requires fast response to changes on both the generation and the utility sides.

### **SEL SOLUTION**

SEL has built an outstanding reputation working with utilities, providing engineering and equipment. We have become a trusted source of expertise and protection. This translates to an effective relationship when bringing new power suppliers onto existing distribution systems.

## Complete Project Management

The SEL Engineering Services Division has an extensive staff of engineers able to perform complete project management for wind farm applications. We have experience in many types of systems and can design a custom solution if needed.



Figure 1 La Venta II Substation Complete Protection and Control Using IEC 61850 Protocol

## Support for Smaller Projects

SEL has field application engineers around the world who can help with smaller connection projects. Smaller generation projects have many cost-saving options to make commercial viability easier to achieve. Reclosers, small breakers, and custom controls can save space and money.



Figure 2 Recloser with Control can be Used for Small Wind Turbine Connection to the Grid

There are many options for connecting generation to the grid. These options can include the SEL-547 Distributed Generator Interconnection Relay, the SEL-651R Advanced Recloser Control, the SEL-351R Recloser Control, and the industry standard for protection: the SEL-351 Directional Overcurrent and Reclosing Relay.

## **PROVEN WIND FARM SOLUTIONS**

Wind generators are only providing value when they are connected to the grid. SEL can optimize the connection, providing secure protection and control. A long-term relationship with utilities has put SEL in a trusted position to provide engineering, equipment, and project management for large or small projects.

SEL has extensive experience in wind farm protection and connection. Our equipment is the standard in the industry, providing the best warranty and support.

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