

SUMMARY OF POWER'S WIND EXPERIENCE



Gneevies, September 2004



Above and below, Aragonne Mesa, 2006



POWER'S WIND PROJECT DEVELOPMENT EXPERIENCE

Chevron Energy Solutions, Wyoming

Site visit and facility and interconnection evaluation of a proposed wind generation facility in Wyoming, to evaluate feasibility of a variety of wind turbine installations to power groundwater contaminant recovery operations at an old refinery site and supply excess power to the grid.

Gneevies 9 MW Wind Farm, County Cork, Ireland

Developed road routes and produced road designs for this wind farm built on a site covered with 3 to 6 feet of ancient peat bog. Carried out soil resistivity tests to establish the requirements for electrical grounding.

Booltiagh 20 MW Wind Project, County Mayo, Ireland

Project identification and initial development and scoping for a 15 x 1.3 MW wind farm, and preliminary engineering and interconnection development for 20kV/110kV on-farm and interconnection electrical systems.

Carrane Hill 4 MW Wind Project, County Sligo, Ireland

Project identification and initial turnkey development and scoping for a 3 x 1.3 MW wind farm, and preliminary engineering and interconnection development for 20kV/110kV on-farm and interconnection electrical systems.

Kilgarvan 45 MW Wind Project, County Cork, Ireland

Developed and designed the site access route across 6 miles of peat bogland. Carried out soil resistivity tests to establish electrical grounding requirements. Following completion of the wind farm, the developer is intending to extend it and we are assisting him with the electrical challenges of meeting the local grid requirements including power factor control.

Midas Wind Farm, Mid-Cork Electric, County Cork, Ireland

Developed and designed the underground interconnection to connect the wind farm to a local substation in an environmentally acceptable manner, in order for him to obtain the required permits.

Athea Wind Farm, County Limerick, Ireland

Developed the initial one-line diagrams, the electrical layout and roads layout for the developer's permitting process. Provided documentation and technical support for his application to the national utility for a connection to the grid.

Hadji Dimitar Wind Farm, Bulgaria

Carried out a technology and cost comparison of the leading turbine suppliers.

Kealkill Wind Farm, County Kerry, Ireland

Worked closely with the developer to establish a suitable route for site access, covering approximately 3 miles through peat bog and forest. Established preliminary locations for turbines and interconnecting roads.



Kilgarvan, 2004



Mid-Cork Electric, 2005



Hardin Hilltop, 2007

**Muing Wind Farm,
County Kerry, Ireland**

Produced drawings to show the proposed underground interconnection route of approximately 7 miles.

**Sempra, California
Wind Project
Acquisition Due
Diligence**

Performed a site visit and due diligence evaluation of turbine-generator installations, O&M records and performance to support Sempra's consideration of acquisition of a large wind development based on earlier-generation (750kW) turbine technology. Also considered feasibility of site for co-location of solar generation facilities.

POWER'S WIND FARM OWNER ENGINEER EXPERIENCE

**Forward 29 MW Wind
Project,
Pennsylvania**

Owner Engineering for Edison Mission Energy for the 14-turbine Forward Wind Project using Suzlon 2.1 MW turbines. Scope included OE services: EPC development, design review and consultation, construction support.

**Hardin Hilltop 14.7
MW Wind Project,
Iowa**

Owner Engineering for Edison Mission Energy for the 7-turbine Hardin Hilltop Wind Project using Suzlon 2.1 MW turbines. This project was the first community-owned wind project in Iowa and the commercial debut of the Suzlon 2.1 machine. Scope included OE services: EPC development, design review and consultation, construction support.

**Lookout 38 MW Wind
Project,
Pennsylvania**

Owner Engineering for Edison Mission Energy for the 18-turbine Lookout Project using Suzlon 2.1 MW turbines. Scope included OE services: EPC development, design review and consultation, construction support.

**SCADA Oversight,
Texas, California,
New Jersey and
Pennsylvania**

Babcock and Brown hired POWER to perform OE engineering for four wind farms totaling 212 MW in capacity. Scope included review and oversight of EPC contractor's SCADA designs for four wind farm projects.

**Redington 54 MW
Wind Project, Maine**

Owner engineering for Edison Mission Energy for the 18-turbine Redington project, based on Vestas V90 3 MW turbines. POWER's scope included OE services: EPC development, design review and consultation, construction support.

**Jeffers 21 MW Wind
Project, Minnesota**

Owner engineering for Edison Mission Energy for the 10 turbine Jeffers Project, based on Suzlon 2.1 MW turbines. POWER's scope included OE services: EPC development, design review and consultation, construction support.

**Sleeping Bear 94 MW
Wind Project,
Oklahoma**

Owner engineering for Edison Mission Energy for the 450 turbine Sleeping Bear Project, based on Suzlon 2.1 MW turbines. POWER's scope included OE services: EPC development, design review and consultation, construction support.



Doug Baker at an Edison Project, 2007



Above and below, Crosswinds, 2007



Crosswinds 21 MW Wind Project, Iowa

Owner engineering for Edison Mission Energy for the 10-turbine Crosswinds Project, based on Suzlon 2.1 MW turbines. POWER's scope included OE services: EPC development, design review and consultation, construction support.

POWER'S WIND FARM EPC AND TURNKEY EXPERIENCE

Tetra Tech and PacifiCorp, Seven Mile 118.5 MW Wind Project, Wyoming	Collection system and substation engineering and design for Seven Mile Hill, including six collection circuits, 79 GE ESS Turbines, and a 230kV/34.5kV substation and the Freezeout 230kV switch station.
Tetra Tech and PacifiCorp, Rolling Hills 118.5 MW Wind Project, Wyoming	Collection system and substation engineering and design for Seven Mile Hill, including six collection circuits, 79 GE ESS Turbines, and a 230kV/34.5kV substation and the Windstar 230kV switch station. Collection system is partly underground, partly above ground.
Tetra Tech and PacifiCorp, Glenrock 118.5 MW Wind Project, Wyoming	Collection system and substation engineering and design for Seven Mile Hill, including six collection circuits, 79 GE ESS Turbines, and a 230kV/34.5kV substation and the Windstar 230kV switch station. Collection system is partly underground, partly above ground.
San Juan Mesa 120 MW Wind Project, New Mexico, USA	Complete design of 120 x 1 MW Mitsubishi turbine wind farm as turnkey JV partner and engineer. Responsible for complete civil design, turbine foundation design, transformer and equipment foundations and structures, medium voltage underground electrical system, substation, SCADA and protective relaying, and HV interconnection.
Aragonne Mesa 90 MW Wind Farm, New Mexico	Complete design of 90 x 1 MW Mitsubishi turbine wind farm as turnkey JV partner and engineer. Responsible for complete civil design, 40 miles of gravel roads, turbine foundation design, O&M building design, transformer and equipment foundations and structures, 34.5 kV underground electrical system, 100 MVA 34.5/138 kV substation, SCADA and protective relaying, and 23 miles of 138 kV transmission line.
Gneevies 9 MW Wind Farm, County Cork, Ireland	Complete turnkey responsibility for 11 x 850 kW Vestas turbine wind farm including permitting, full engineering, construction, turbine supply and erection, medium voltage underground electrical system, substation, SCADA, relaying, high voltage interconnection, and power factor management software and systems. Involved fast-track design and construction in an extremely challenging mountain area in severe winter conditions.



Ben Guth at Crosswinds



Aragonne Mesa, 2007



Kilgarvan, 2004

Kilgarvan 45 MW Wind Project, County Cork, Ireland

Complete engineering and electrical system turnkey responsibility for 15 x 3 MW Vestas turbine wind farm including permitting, full engineering, electrical construction, medium voltage underground electrical system, substation, SCADA, relaying, high voltage interconnection, and power factor management software and systems. Involved fast-track design and construction in an extremely challenging mountain area in severe winter conditions, using the first 3 MW Vestas turbines ever installed on shore.

Midas 29 MW Wind Project, County Kerry, Ireland

Turnkey engineering and construction for collection substation and underground 110 kV transmission line, plus engineering for electrical and civil, including foundation design for both Vestas V52 and Vestas V 90 WTGs.

POWER'S EXPERIENCE IN T&D FACILITY DEVELOPMENT AND PERMITTING FOR WIND PROJECTS

Valley County 500 MW Wind Energy Project, Montana

Responsible for MFS/EA, Montana: First BLM EA tied to wind PEIS, BLM, WAPA, MDEQ, 31-mile 230 kV interconnect line

Golden Sunlight 60 MW Wind Project, Montana

Responsible for Environmental Assessment, Montana: BLM, MDEQ

Aragonne Mesa 90 MW Wind Farm, New Mexico

Responsible for engineering, procurement and commissioning of substation and transmission line.

Goshen 100 MW Wind Farm, Idaho

Preliminary engineering, BPA NEPA, biological and cultural surveys

Post Wind 84 MW Project

Underground collection and interconnection switchyard engineering and design

Sweetwater IV 150 MW Wind Farm, Wyoming

Responsible for preliminary and detailed design for substation and interconnection.

FPL, Stateline Generation Project, Washington

Responsible for acceptance testing of the wind generation project at the Nine Mile 230 kV-115 kV substation in southeast Washington. Scope included acceptance testing for 230 kV equipment, 115 kV equipment, 34.5 kV equipment, relays and station equipment.

FPL, Uinta Wind Farm, Wyoming

Responsible for testing and start-up of the 128 kV-34.5 kV Hinshaw substation. POWER's scope included testing of the 34.5kV switchgear and cap bank, the 138 kV SF6 circuit breaker, and protective relays.

TXU, Rio Pecos Line, Texas	POWER is TXU's engineer for the upgrade of 69 kV and 138 kV lines to support the Lower Colorado River Authority's wind generation sites. The project involves reconductoring and rebuilding of 59 miles of 138 kV and upgrading of 34 miles of 69 kV to 138 kV.
Seawest, Tehachapi/ Vincent Line, California	POWER designed a 42-mile 230 kV transmission line from the Tehachapi wind generation complex to SCE's Vincent Substation in Southern California.
Enron Wind, Sims/Dunmire Interconnect, Wyoming	POWER performed preliminary engineering and cost estimating for a proposed 115 kV interconnect to a 40 MW wind project in Wyoming. Estimating was very detailed, and included engineering man-hours and costs, as well as a total probable construction cost.
Wind Hunter, Valley County Project, Montana	POWER's work involved siting and routing of a 30 mile 230 kV interconnection transmission line for a planned 500 MW wind project in northern Montana. The project, now in progress, involves preliminary engineering studies, and extensive permitting and environmental support including a tiered EA for MEPA and NEPA.
Eurus, Combine Hills Substation, Oregon	POWER performed performance testing for the 69 kV-34.5 kV Combine Hills Substation, which accepts power from the Combine Hills Wind Project. POWER tested SF6 and vacuum breakers, 38 kV air disconnect switches, PTs and CTs, relays, and power factor management systems.