John Vanden Bosche

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PROFILE A skilled mechanical engineer, experienced in the wind energy industry, who is also a registered U.S. patent agent.

EDUCATION:

University of Texas at El Paso *El Paso, Texas* | 1996
Master of Science, Mechanical Engineering
Thesis topic was Control Strategy Options for Variable Speed Wind Turbines.

West Virginia University *Morgantown, West Virginia* | 1989
Bachelor of Science, Mechanical Engineering

EXPERIENCE:

Chinook Wind *2001 – present*
Principal Engineer

Developed a new business providing engineering consulting services to the wind industry. Services provided include wind turbine design, testing, and analysis, owner engineering, performance monitoring and evaluation, wind data collection and analysis, site selection, due diligence, and project management. Clients include project developers, wind turbine manufacturers, independent power producers, utilities, and government research laboratories.

U.S. Patent Agent *1991 - Present*
Self Employed

Built and ran a small but profitable business as a registered U.S. Patent Agent. Clients are from industry and academia and represent a wide variety of technologies.

Global Energy Concepts *1998 –2001*
Project Engineer

Worked with clients in the wind industry on a variety of projects providing technical advice regarding power curve measurements, turbine commissioning, SCADA system planning, design, and installation, evaluation of wind turbine retrofit options, investigation of lightning damage and icing effects, and development of operation and maintenance strategies. Provided contract review and due diligence services to utilities and wind plant developers. Also served as Principal Investigator in a research project investigating methods for self-erection of wind turbines.

Dynamic Design *1996 –1998*
Senior Engineer

Provided engineering consulting services to the wind energy industry in California and to the National Renewable Energy Laboratory. A major focus of the work was field testing of wind turbines. Performed loads and dynamics tests on six turbines ranging in size from 100 kW to 500 kW. Contributed conceptual ideas and practical field experience to the design team working on the Wind Eagle, an innovative highly flexible wind turbine. Also provided services in modeling, analysis, evaluation, and documentation of wind turbine designs.

University of Texas at El Paso *1994 - 1996*
Research Assistant

Assisted with several state and federally funded research projects in the area of wind energy. The research was in the areas of meteorology and site characterization and development of a variable speed rotor. Led a team developing a variable speed wind turbine and controller.

Wind Harvest Company *1991 - 1993*

Project Engineer

Built, tested and analyzed prototypes of three different models of the Windstar, an innovative vertical axis wind turbine. Installed a wind farm in South Wales, UK. Work in the UK involved wind site prospecting, meteorological data analysis, and negotiating land leases.

PAST CONSULTING CLIENTS

PacifiCorp Power Marketing
GE Wind
enXco
Bonneville Power Administration
Windland
Energy Unlimited, Inc.
Renewable Energy Systems USA
Southwest Windpower
Suzlon Energy
Town of Laurel, NE
Global Energy Concepts
Sequoia Energy
Coastal Community Action Program
Ocean Wind Energy Systems
Wind Harvest Company
Fortrend Engineering
Florida Power & Light
SeaWest
Cannon Power Corp.
Suzlon
Dutch Energy
BP Alternative Energy
Gael Energy
TPI Composites
Dynamic Design
U.S. Department Of Energy
National Renewable Energy Laboratory
Electric Power Research Institute
Wisconsin Public Service
Black & Veatch
Valmont Industries
Basin Electric
Wind Energy Group, Ltd.
Gold, Bennet, & Cera
PS Enterprises
Met-Tech
Southwest Die Corp.
X-L Synergy
Law Office of Wayne Pritchard
Vestas America
Clipper Windpower
Ridgeline Energy
Chevron Technology Ventures

CONSULTING SERVICES PROVIDED

Wind turbine power performance testing
Wind turbine structural testing
Wind turbine dynamics & vibration testing
Test data analysis and interpretation
Wind turbine performance evaluation
Wind farm performance monitoring
Wind farm construction management
Wind turbine commissioning
Wind turbine component design
Wind turbine retrofit design
Meteorological data collection
Meteorological data review and analysis
Wind site prospecting
Wind site analysis and qualification
Direct procurement of international patents
Negotiation of land leases for wind sites
Appraisal of wind farms
Appraisal of individual wind turbines
Appraisal of spare parts inventories
Project performance projections
Economic feasibility studies
Proforma review
Contract review
Due diligence review
Expert witness report preparation
Develop intellectual property strategy
Draft U.S. patent applications
Prosecute U.S. patent applications
Patentability and validity searches

Meteorological tower planning and installation
Evaluation of windfarm output impacts on utility system operation
Direction of avian, environmental, noise, transmission, geotechnical, aviation, and cultural studies

WIND TURBINES WORKED ON

Zond Z-40A	Tacke 600e
Zond Z-40FS	Vestas V15
Enron MW	Vestas V17
Wind Eagle	Vestas V27
Nedwind N40	Vestas V39
MHI-250	Vestas V47
MHI-600	Vestas V66
Micon 108	Bonus 65 kW
Nordtank 65	Bonus 1.3 MW
WEG MS4	PSE 100 kW
Kenetech MVS 33	Windstar 160
Kenetech KVS 46	Windstar 530
AOC 15/50	Windstar 1066

WIND INDUSTRY PROFESSIONAL SERVICE

Board of Directors for Northwest SEED
Member of IEC Power Performance Testing Standard Committee
Member of Technical Committee for 2002 Global Windpower Conference
Wind resource assessment subcommittee of the Idaho State Wind Working Group

PUBLICATIONS

Comparison of Methodologies for Power Performance Testing
American Wind Energy Association Conference Proceedings, May 2005.

GIS Mapping Tools to Promote Policies and Community-Scale Projects
American Wind Energy Association Conference Proceedings, May 2005.

Low Windspeed Turbine Project Conceptual Design Study Advanced Independent Pitch Control, May 2004.

Simple Arrays of Wind Turbines as a Practical Alternative to the Single Large Rotor Machines, American Wind Energy Association Conference Proceedings, May 2003.

Development of a Renewable Energy Resource Atlas of the West
American Wind Energy Association Conference Proceedings, June 2002.

TVP News Bulletin and Quarterly Stats Page
U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, 1999-2001.

Wisconsin Low Wind Speed Turbine Project Third-Year Operating Experience: 2000-2001
U.S. Department of Energy - Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-1004041, December 2001.

Iowa / Nebraska Distributed Wind Generation Projects First and Second-Year Operating Experience: 1999-2001, U.S. Department of Energy - Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-1004039, December 2001.

WindPACT Turbine Design Scaling Studies Tehnical Area 3 – Self-Erecting Tower and Nacelle Feasibility March 2000 - March 2001. (2001). 72 pp.; NICH Report No. SR-500-29493.

Project Performance in the DOE-EPRI Wind Turbine Verification Program
America Wind Energy Association Conference Proceedings, June 2001.

Baseline Power Performance Test for the Z-50 Wind Turbine in Algona, Iowa
U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, December 2001.

Baseline Power Performance Test for the Z-50 Wind Turbine in Springview, Nebraska
U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, December 2001.

Baseline Power Performance Test for the AOC 15/50 Wind Turbine in Kotzebue, Alaska
U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, December 2001.

TVP Project-At-A-Glance: Wisconsin Low Wind Speed Turbine Project, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, February 2001.

TVP Project-At-A-Glance: Iowa Distributed Wind Generation Project, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, February 2001.

TVP Project-At-A-Glance: Nebraska Distributed Wind Generation Project, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, February 2001.

Power Performance Testing Progress in the DOE/EPRI Turbine Verification Program
15 pp.; NICH Report No. CP-500-30667

Power Quality of Distributed Wind Projects in the Turbine Verification Program
13 pp.; NICH Report No. CP-500-30407

Power Performance Testing Activities in the DOE-EPRI Turbine Verification Program
15 pp.; NICH Report No. CP-500-28589.

Review of Operation and Maintenance Experience in the DOE-EPRI Wind Turbine Verification Program. 13 pp.; NICH Report No. CP-500-28620.

Comparison of Projections to Actual Performance in the DOE-EPRI Wind Turbine Verification Program. 14 pp.; NICH Report No. CP-500-28608.

Wisconsin Low Wind Speed Turbine Project First- and Second-Year Operating Experience: 1998-2000, U.S. Department of Energy - Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-1000959, June 2000.

Wind Turbine Verification Project Experience: 1999, U.S. Department of Energy - Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-1000961, June 2000.

Baseline Power Performance Test for the Tacke 600e Wind Turbine in Glenmore, Wisconsin, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, December 1999.

Project Development Experience at the Iowa and Nebraska Distributed Wind Generation Projects, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-112835, December 1999.

Baseline Power Performance Test for the Z-40FS Wind Turbine in Searsburg, Vermont, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, September 1999.

Wisconsin Low Wind Speed Turbine Project Development, U.S. Department of Energy-Electric Power Research Institute Wind Turbine Verification Program, EPRI TR-111438, December 1998.

Balancing Energy Capture and Structural Loads on Variable Speed Wind Turbines. Collection of the 1997 ASME Wind Energy Symposium Technical Papers Presented at the 35th AIAA Aerospace Sciences Meeting and Exhibit, 6-9 January 1997, Reno, Nevada. Washington, DC: American Institute of Aeronautics and Astronautics; pp. 309-318; NICH Report No. 23291.

Control Strategy Options for Variable Speed Wind Turbines, The University of Texas at El Paso, Master's Thesis, July 1996.

Control System Design for a Variable Speed Yaw Controlled Wind Turbine. Windpower '95: Proceedings of the Annual Conference and Exhibition of the American Wind Energy Association, 26-30 March 1995, Washington, DC. Washington, DC: American Wind Energy Association; pp. 187-193; NICH Report No. 21805.

PRESENTATIONS

Wind Turbine Aerodynamics
West Virginia University — October 1996

Patent Law –Mechanical Engineering graduate seminar,
University of Texas at El Paso — February 1995

Patent Law –Electrical Engineering graduate seminar
University of Texas at El Paso — April 1995

Cold Weather Operation Concerns – Utility Wind Interest Group workshop
Anchorage, AK — June 2000

Self Erecting Wind Turbine Workshop
National Renewable Energy Laboratory — September 2000

PATENT EXPERIENCE

Patent No.	Inventor	Title
5,219,454	Class	Method & apparatus for balancing wind turbine rotors
5,332,925	Thomas	Vertical windmill with omnidirectional diffusion
5,411,471	Terrazas	Neck relaxer
5,419,572	Stiller et al	Reciprocating bicycle drive
5,533,418	Wu et al	Spherical robotic shoulder joint

5,558,892	Pelka et al	Method and apparatus for making churros
5,676,032	Johnson	Steel rule die with closely nested cavities
5,758,025	Wu	Dynamically adaptive fuzzy interval controller
5,844,759	Hirsh et al	Electrical fault interrupter
5,937,896	Hirsh et al	Shock & arc protection for an electrical distribution system
5,943,198	Hirsh et al	Electrical fault interrupt circuits
5,983,766	Johnson	Steel rule cutting die with removable cutting units and method for using same
6,192,821	Morales et al	Boat mounted hydro-alternator
6,478,606	McNerney	Twist-on connector with a heat-shrinkable skirt
6,616,034	Wu et al	Radio frequency identification system
6,664,704	Calley	Electrical machine
6,703,718	Calley et al	Wind turbine controller
6,749,399	Heronemus	Vertical array wind turbine
6,902,370	Dawson et al	Telescoping Wind Turbine Blade
6,932,558	Wu	Wafer Aligner

REFERENCES

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