EnergyWorks Professional Services

Statement of Qualifications

Professional Services

Wind Power - Project Implementation

JULY 2008
Introduction

EnergyWorks was established by Bechtel Enterprises, Inc. and PacifiCorp in 1995 in response to evolving energy and infrastructure needs utilizing both conventional fossil fuel sources, primarily liquid and natural gas fuels and renewable sources such as wind. In 1999, the company was purchased by Iberdrola, S.A., one of Europe’s leading electric utilities. As an Iberdrola subsidiary, EnergyWorks expanded to include operations in six countries, with commercial and industrial energy infrastructure investments totaling nearly $300 million.

In mid-year 2001, EnergyWorks senior management negotiated a buyout of operations in the United States and Canada. EnergyWorks North America was formed as a Maryland limited liability company. The owner-manager principals of EnergyWorks North America have collaborated on a wide variety of successful energy and infrastructure projects since 1992.

One of EnergyWorks’ primary areas of business focus is the rapidly evolving wind industry. Since its inaugural Costa Rican wind projects in 1996, EnergyWorks has expanded its presence in the wind industry and is currently managing the project implementation of a number of number of projects in the US and Canada, ranging from a 150 MW, utility owned facility in Canada to a 7.5 MW, developer-driven showcase project within an existing, confined, waste water treatment plant in the United States. EnergyWorks has played a key role in the development support and implementation of over 1,500 MW of wind power generation.  Implementation and Upgrade/Repair Management workload in 2008 to date includes the following:

1. 290 MW wind farm, MHI – Project Management/Site Management – Texas
2. 120 MW wind farm, GE – Project Management/Site Management - Texas
3. 90MW wind farm, Gamesa – Construction Management – Pennsylvania
4. 60MW wind farm, GE – Site Management – South Dakota
5. 60MW wind farm, GE – Site Management - Wisconsin
6. 100MW wind farm – Site Management - multiple New York
7. Multiple sites throughout US and Canada – WTG Repair Management

The EnergyWorks team is diverse; it has worked with the industry wind turbine suppliers, General Electric, Vestas, Gamesa, Mitsubishi and NEG-Micon (now integrated into Vestas). The team has worked in many areas of the world, including North America, Latin America and Europe, and can support any individual stage of a wind project venture or provide support to a project venture from development and implementation to operations and maintenance. What is your need?

Organization and Approach
The organization and approach of EnergyWorks Professional Services (EWPS) are built upon the broad and complementary capabilities of its Principals, who have collaborated on wide variety projects over the last fifteen years. The Principals combine many years of professional experience in the disciplines of development, engineering, construction management, project management, operations, maintenance and asset management. This experience spans industrial and institutional sectors from petroleum and chemicals, manufacturing, electrical utilities to military and governmental agencies.

Focus and Capabilities

EnergyWorks Professional Services was established to respond to needs to plan, develop, and implement medium-scale capital projects. Such projects require the same sophistication as large projects; however, their economics cannot tolerate organizational redundancies typically inherent in the management of large projects. EWPS’s solution is to create an efficient, customized service offering to ideally complement the in-house capabilities of its clients, allowing the client to concentrate on its core business, usually as developer, marketer, financier, equipment supplier or facility operator.

The offering by EnergyWorks includes all phases of project development, project implementation and project operations and maintenance.

**Project Development Services** — Project Development Services can be provided to acquire existing assets or develop and implement a capital project under a variety of funding scenarios, including limited recourse project finance. This capability includes:

1. **Pre-Feasibility Studies** — Proposed sites are analyzed to determine wind project feasibility based on site inspections, wind resource information, regulatory requirements, energy market conditions and renewables tax credits, and discussions with stakeholders such as local authorities, landowners, and electrical network operators.

2. **Wind Measurements and Analysis** — A crucial step in validating the viability of proposed sites is performing direct wind measurements to augment available meteorological data. This process could take a year or two depending on the quality of existing wind data.

3. **Feed-In, Power Purchase, and Interconnection Agreements** — Agreements on grid interconnection and power transport must address utility concerns regarding transmission capacity, reliability, and effects on grid operations. Power purchase agreements can be simple energy-only contracts or more sophisticated arrangements that include capacity, energy, ancillary services, dispatchability, and other grid support services.

4. **Building Permit Inquiry** — The attitude and requirements of the permit granting authorities and the local community are determined early in the process and a preliminary application for granting a building permit must be submitted to appropriate authorities.

5. **Property Arrangements** — Property arrangements needed to operate large wind farms differ significantly from that for distributed wind projects with many small clusters on farmland or other individually owned property. Property arrangements typically must meet financial, environmental, zoning, and leasing objectives of different stakeholders.

6. **Project Design and Optimization** — This is the step where the value of a project is maximized. Wind turbines, project configuration (farm, distributed, hybrid), operating strategies, and risk management strategies are designed or selected to maximize project value based on the unique needs and constraints of the region.
2. **Manufacturer and subcontractor selection** — Once the technical requirements of a project are fully developed, appropriate technologies and vendors will be selected and delivery, pricing, and other terms established.

3. **Final Feasibility Study** — The economic viability of a project is thoroughly analyzed on the basis of all "hard facts" and requirements that have become evident in the previous stages of project development. The final feasibility study will include expert reports and recommendations on all the issues identified above.

4. **Proposals, Applications, and Contract Negotiations** — Final applications for building permits, proposals for power purchase agreements, property agreements, etc. will be submitted and final agreements negotiated once the detailed feasibility study is complete.

**Project Implementation Services** — Project Implementation Services are professional services necessary to take a project from the “on-paper” phase to installed assets. This capability includes:

1. **Basic and Detailed Engineering and Design**—The conceptual design presented in feasibility study is evolved into a basic design followed by detailed design. These stages incorporate technical details from the selected supplier of major equipment. Often, cost-benefit studies are performed to optimize a design or solution.

2. **Contract negotiations** — Contract negotiations are required for the procurement of major equipment and construction services. Skilled contract negotiators can save the owner substantial money.

3. **Project Management** — The project management team will include a project manager and project controls (budget and schedule control). Additional support staff capability includes safety, procurement, logistics and quality. The project management team advances the successes brought about during the project development phase.

4. **Site Management / Construction Management** — For large projects, a site project manager may be required with a complement of construction manager(s), field engineers, safety officer, logistics, quality control and project controls. The site team is an extension of the project management team.

5. **Commissioning** — Commissioning specialists will transition the project from a construction program into an operating facility.

**Operations and Asset Management Services** — Operations and Asset Management Services set up the project operation by hiring key staff and implementing technical and business systems to maximize revenue while minimizing expenses.

1. **Annual business plan development** — A management tool required to forecast revenues and expenses.

2. **Staffing of the Operating Facility** — An analysis is required to optimize the skill-sets required. These skill-sets are either hired or subcontracted. An efficient team is established to operate and maintain the facility over the life of the facility.

3. **Stocking of consumables and spare parts** — This activity is an iterative process to provide the optimal initial stocking of supplies and the on-going change-out of parts and consumables.
Service Approaches

For clients accustomed to in-house management of project execution, EWPS expands their capabilities by adding depth and/or breadth to project development and execution. EWPS is highly sensitive to client internal processes and, where necessary, adapts to established policies and procedures. In so doing, the EWPS team integrates seamlessly with the client’s organization. EnergyWorks Professional Services’ capabilities are offered as **five distinct service categories:**

- **Technical Consulting** – Technical Consulting services include the performance of pre-engineering studies, basic design, troubleshooting, engineering analysis, reviews (including HAZOPS), inspections and audits which may be limited to a particular technical aspect of capital project or operating facility.
  - Pre-Engineering Studies – Include initial site investigations to define/refine the scope of the project, develop the technical solution (incl. heat and material balance, water balance, short circuit studies), develop preliminary cost estimates and milestone schedule.
  - Basic design – Following pre-engineering, a basic design will be performed to establish the fundamental framework of the project including site layout, process flow diagram, electrical single line, piping and instrumentation diagrams, equipment list, equipment specification, and design basis. The project cost estimate and milestone schedule will be further refined.

- **Engineering, Procurement and Construction (EPC) Management** – Engineering, Procurement and Construction Management services include integration and coordination of engineers, equipment suppliers and construction contractors, on-site management, planning and cost control, quality of workmanship and facility commissioning. EWPS will perform as the client’s construction site manager or take on the overall EPC management function on behalf of its clients.
  - EWPS develops customized pre-engineering studies, basic designs including optimized heat material balances, water balances, general plant layout, process flow diagrams (PFD), piping and instrumentation diagrams (P&ID), electrical single line, equipment list, major equipment specifications, and plant design criteria.
  - EWPS manages completion of detailed design, equipment procurement, construction subcontract execution, project scheduling and updated project budgets.
  - EWPS coordinates the delivery of equipment and on-site construction activity.
  - EWPS integrates commissioning activity at the time during construction such that overlap of construction and commissioning occurs with minimum interference to meet accelerated project schedule timeframes.
  - EWPS integrates the operations team into commissioning activity to provide a smooth transition from construction to plant commercial operations.

- **Project Management** – Project Management services provide broad project oversight on behalf of the client. EWPS will monitor performance of engineers, suppliers and construction contractors and act to ensure that project milestones, budget, construction quality and specific performance parameters are met.
  - EWPS provides full-time, on-site construction coordination and supervision.
  - EWPS provides logistical coordination of shipment of equipment from point of manufacture to the job site including expertise to move international shipments through customs.
• **Operations and Asset Management** – Operations and Asset Management services include the development of business and production systems, staffing (including training) and strategies to implement the facility Operations and Maintenance activities. Asset Management establishes long-term operational criteria for production planning, asset evaluations and annual profit and loss management.

  o EWPS provides operational expertise to train permanent plant management, operations and maintenance personnel. Long-term operations oversight and supervision (as necessary) is available as needed to supplement local personnel in critical plant operations.

• **Management Consulting** – Management Consulting involves the transfer of management know-how to the client without direct management and supervision by EWPS.

**Individual and Project Experience**

The experience of key EWPS team members, including past project involvement are described in the following attachments.

Attachment A – Experience Resumes – Principles – Summary

Attachment B – Project Experience - Summary
Mr. Thompson joined EnergyWorks in 1997 and has led the company as President and CEO since 1999. His extensive international business experience and an in-depth understanding of the value-chain for energy services delivery provide the foundation for creation and management of the EnergyWorks businessWEB, a network of expert professionals and companies that enables EnergyWorks to seamlessly provide broad, world-class expertise and capabilities with minimal structural costs.

In a career spanning over 25 years, Patrick has held a number of key management roles in the energy and construction industries, including a variety of pace-setting domestic and international energy projects. As Manager of Industrial Cogeneration for Bechtel Power Corporation, he led development of “mass-customization” for mid-range industrial cogeneration facilities. Prior to joining Bechtel, he served as a nuclear submarine officer in the US Navy.

As EnergyWorks’ VP of Technology and Customer Operations, Patrick led the integration of technical sales support, project implementation, plant operations and asset management to meet the demands of limited recourse financing for international projects. As President and CEO of the EnergyWorks Group, he led the company’s successful transition from startup to operations in six countries and, later led a successful management buyout of the company’s North American operations.

Patrick formed Energy Infrastructure Leasing, LLC and led the acquisition of an energy concession at large commercial complex in Lancaster, Pennsylvania in 2003. He subsequently managed the development and implementation energy efficiency, technology upgrades and the integration of web-based systems to improve the quality, efficiency and delivery of HVAC and electricity services to EnergyWorks’ 175 commercial customers at the facility.

Patrick received a BS in Engineering from the US Naval Academy, Annapolis; MS in Engineering from the University of Michigan, Ann Arbor; MBA from the University of California, Irvine.

Mr. Emsurak joined EnergyWorks as corporate Director of Plant Installations in 1997 and was later promoted to Vice President of Engineering and Construction. In addition to his responsibilities for engineering and construction of projects originated by EnergyWorks North America, he manages its Professional Services practice, providing engineering and project management services to turnkey contractors, project developers and others.

Mr. Emsurak has over twenty-five years of engineering and project management experience in the electric power, oil and gas industries. He has managed important US domestic and international
projects for major firms, including Gulf Oil Corporation, Bechtel Petroleum Operations, Inc. and John Brown E&C. Previously, he served as an officer in the US Navy Civil Engineer Corps.

George has drawn upon his considerable experience to create a standardized Project Delivery System, capable of achieving fast track implementation, using local contractors and management staff at domestic or international locations. The process has been proven by on-time, within-budget completion of EnergyWorks projects in the United States as well as international locations including Brazil, Venezuela, Mexico, Canada, Costa Rica and Spain. This execution capability provides competitive advantage to EnergyWorks through the ability to minimize risks, lower costs and accelerate start of service site commercial operations.

George received Bachelor of Science degrees in Petroleum Engineering and Mineral Economics from Pennsylvania State University, State College.
Project Implementation

EnergyWorks involvement in Wind projects is extensive and continues to grow. The following provides a listing of specific wind project involvement. Other fossil fuel projects are referenced later only to provide the reader with a breath of “related” types of projects undertaken over the past 15 years.

Wind Power Projects

- 290 MWe (Mitsubishi turbines) Gulf Winds I Wind Farm, Corpus Christi, Texas, Project Management and Site Management
- 120 MWe (GE turbines) Great Plains Wind Farm, Gruber, Texas, Project and Site Management
- 60 MWe (GE turbines) Wessington Springs Wind Farm, South Dakota, Site Management
- 60 MWe (GE turbines) Butler Ridge Wind Farm, Wisconsin, Site Management
- 60 MWe (GAMESA turbines) Allegheny Ridge II, Altoona, PA, Site Management
- Multiple NY Wind farms in upstate New York (GE turbines), Site Management
- 300 MWe (Mitsubishi and GE turbines) Cedar Creek Wind Farm, Gruver, Colorado, Project Management and Site Management
- 63 MWe (Vestas V-90) Solano Wind Project, Sacramento, California, Project Management
- 90 MWe (Gamesa) Allegheny Ridge, Central Pennsylvaina, Construction Management
- 63 MWe (Vestas V-90, 105m tower) Snyder Wind Project, Snyder, Texas, Project Management
- Multiple Sites throughout US and Canada, WTG Upgrade and Repair Management
- 90 MWe (90 x 1000A, 1.0MW, Mitsubishi) Aragonne Mesa Wind Farm, Santa Rosa, New Mexico, construction site representative for Babcock & Brown.
- 150 MWe (83 x V80, 1.8MW, 67m, Vestas) Rushlake Creek wind generation facility, Swift Current, Saskatchewan, $200 MM CAN, project management, construction management.
- 54 MWe (30 x V80, 1.8MW, Vestas) Miller Mountain wind generation facility, Gaspe region of Quebec, Canada, construction management.
• 54 MWe (30 x V80, 1.8MW, Vestas) Copper Mountain wind generation facility, Gaspe region of Quebec, Canada, construction management.

• 7.5 MWe [5 x sle, 1.5MW, GE Wind Energy (GEWE), 77m rotor wind turbines on 80 meter, 3 section towers], Jersey Atlantic wind project, Atlantic City, New Jersey, Owners Engineer, constructions management, on-going.

• 24 MWe [12 x G87 2MW, Gamesa], Bear Creek, Wilkes Barre, Pennsylvania, construction management, on-going.

• 7 MWe (9xM1500/750 wind turbine generators, NEG Micon) Facility; Tilaran, Costa Rica; $7 MM; Project Management, Operations and Asset Management.

• 24 MWe (32xNM750/44 wind turbine generators, NEG Micon) wind generation facility; Tilaran; Costa Rica; $30 MM; EPC Development.

• 24 MWe (33xNM750 wind turbine generators, NEG Micon) wind generation facility; Foote Creek; Wyoming USA; Construction management for wind turbine supplier, accelerated schedule, remote location.

Other Power Projects (for breath of experience only)

• 46 MWe (2x LM2500, General Electric) cogeneration plant for natural gas processing host; Bakersfield, California; $46 MM; Project Development, Full EPC, Commissioning, Operations and Asset Management.

• 80 MWe (2xFrame 6B, General Electric) cogeneration plant for a natural gas processing host; Bloomfield, New Mexico; $46 MM; EPC Turnkey, Project Management.

• 48 Mwe (1xGE LM6000, General Electric) simple cycle power generation plant for municipality of Colton, Ca.; $43 MM; EPC Turnkey, Project Management.

• 120 MWe (1x1x1, combined cycle, GE 7EA x Deltak HRSG x GE steam turbine), PowerSmith Cogeneration, Oklahoma City, Oklahoma, Owner’s Engineer, performance analysis.

• 10 MWe (2xE GT Typhoon, Alstom) Combustion Turbine cogeneration plant for a brewery host; Jacarei, Brazil, $12 MM, Full EPC, Operations and Asset Management.

• 5 MWe (2x16V25SG Wartsila Genset) cogeneration plant for a brewery host; Pacatuba, Brazil; $7 MM; Full EPC, Operations and Asset Management.

• 10 MWe (9xVHP 7100 GSI Waukesha) Power Plant for automobile assembly host; Valencia, Venezuela; $11 MM; Full EPC, Operations and Asset Management.

• 30 MWe (1xLM2500 General Electric, with backpressure steam turbine) Cogeneration Plant for automotive tire manufacturing facility: Aranda del Duero, Spain.
• 97.5 MWe (2xFrame 6B, General Electric, with backpressure steam turbine) cogeneration plant for a plastics manufacturing host; Cartagena, Spain; $62 MM; Full EPC, Operations and Asset Management.

• 17 MWe (1xSeimens backpressure steam turbine generator) captive generator for a chemical plant host; Capuava, Brazil; $17 MM; Asset Acquisition, Operations and Asset Management.

• Three 5.4 MWe (3xCaterpillar 3512 gensets) utility island for internet data centers; Sao Paulo, Rio de Janeiro, Buenos Aires; $52 MM; Asset Acquisition, Operations and Asset Management.

• 30 MWe (6XTBD632 Deutz gensets) cogeneration plant for a dairy products processing facility; Villarobledos, Spain; $19 MM; Asset Acquisition, Operations and Asset Management.

• 45 MWe (1xLM6000 combustion turbine generator, General Electric) cogeneration plant for brewery and paper products hosts; Monterrey, Mexico; $36 MM; EPC Project Management.

• 7.5 MWe (EnergyWorks-owned 69kV substation, central hot/chilled water and electricity distribution), energy center and distribution infrastructure for a super-regional shopping mall with over 1.4 million square feet of leasable space in Pennsylvania; as owner-operator an EnergyWorks affiliate employs a full-time staff of 8 and provides electricity and HVAC services to over 150 commercial customers.

Oil and Gas Projects

• 250 MM BTU/Hr, Steam Injection, modular design, Central Wyoming, Department of Energy, $15 MM, Project Development, Project Manager.

• 100 MMSCF/D Natural Gas Processing (LTS) Plant, Central California, Chevron, Department of Energy, $40 MM, Construction Management.

• 400 x 1000 HP Engines at 34 Gas Processing Plants in the United States, Operations and Asset Management.

Public Works Projects

• Wastewater pumping station re-powering (1x2 MWe Baldor backup diesel generator) for Venezuelan Ministry of Natural Resources and the Environment; Turnkey EPC.