



BUSH POWER GROUP LLC

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Principal Consultant

Listed below are our qualifications to serve you. We bring 42 years of experience in the public power utility, independent power, industrial power, refinery power, LNG regasification, waste-to-energy plasma gasification power & liquids plants, and pipeline compression arenas to assist in:

- Basic Engineering and Scope definition
- Conceptual design of gas turbine-based power plants: simple cycle, combined & cogeneration
- Conceptual design of power plant and pipeline compression facilities for LNG & N2
- Conceptual design of power, chilled water, steam, air, and water production systems
- Construction compliance oversight and monitoring
- Desalination plants integrated with cogeneration power plants
- Development of Waste-to-Energy Synthesis Gasification Power Plants
- Development of Waste-to-Energy Synthesis Gasification Synthetic Diesel Fuel Plants
- Integration of LNG Regasification Facilities with gas turbine based power & desalination plants
- Integration of Synthesis Gas Plant with Refineries to produce hydrogen, steam & power
- Litigation Support
- Performance optimization models for power and heat rate monitoring
- Plant performance testing guidelines, procedures, and acceptance testing
- Power Plant Operations Optimization & Troubleshooting
- Power Purchase, Fuel Supply, & Performance Guarantee Agreements
- Project Controls & Scheduling
- Re-powering of Refinery, Municipal, and Rankine Cycle plants to improve efficiency
- Start-up oversight, procedure reviews, commissioning monitoring
- Technical support & auditing of the procurement of capital and BOP equipment

SUMMARY OF ACCOMPLISHMENTS

2002, Organized as BUSH POWER GROUP LLC in the State of Texas

- Consultants for Kvaerner Power E&C in San Ramon, CA for a 1 x 1, GE7FA combined cycle plant. We prepared the project heat and material balances and recommended turn-key performance guarantees to Kvaerner's executive management for their offer to their utility client. It was a first for Kvaerner to offer turn-key guarantees subject to liquidated damages for shortfalls in performance. Kvaerner won the bid.
- Prepared performance comparisons of inlet chilling vs. inlet fogging, evaporative cooling, and no inlet conditioning for a major gas turbine inlet chilling manufacturer and supplier.
- We represented the owners of the Pantanal 585 MW, 2 x 1 Siemens V84.3A combined cycle plant in Cuiaba, Brazil on the final performance acceptance test consisting of a heat rate guarantee corrected to 25°C and a maximum power output test corrected to 33°C.
- We supported Lockwood Greene Engineers, Atlanta, GA on a proposal effort for an 1150 MW combined cycle plant.

- We completed a due diligence study of a 550 MW 2x1 combined cycle power plant for Lockwood Greene Engineers, Atlanta, GA.
- We supported AUS Corp on the performance of a LM6000 Sprint in simple cycle for a proposal.
- We modeled the Penuelas 507 MW LNG/LPG/#2FO 2x1 combined cycle power plant to provide recommendations for part load operations and optimization.
- We modeled the Penuelas 507 MW LNG/LPG/#2FO 2x1 combined cycle plant and solved the low load operational problems and emissions issues.
- We supported AUS Corp on their proposal to install a SCR in an existing Rankine Power Plant on the west coast.
- We supported the Owner of Brazos Valley Energy, LP in Thompson's, TX on the plant performance test consisting of ASME PTC 22 test for the gas turbines, PTC 6 test for the steam turbine generator, and a PTC 46 overall performance test for the facility. This is a 600+ MW, 2x1 GE 7FA Combined Cycle power plant complete with inlet chilling on the gas turbines and duct firing in the HRSG's.
- We supported the Owner of the Gaza Power Plant in the Gaza Strip on the plant performance testing consisting of simple cycle testing of each gas turbine generator and combined cycle testing of two (2) blocks of 2x1 Alstom GT10 gas turbines, HRSG's and steam turbine generator.
- We supported TransAlta on the Campeche Combined Cycle Plant in the state of Campeche, Mexico. The plant performance test consisted of Power Island test for the gas turbine, HRSG, and the steam turbine generator; a PTC 46 overall performance test for the facility. This is a 250+ MW, 1x1 MHI 501F single shaft, combined cycle power plant complete with evaporative cooling on the gas turbines and duct firing in the HRSG's. The plant is dual fuel, gas and #2 fuel oil.
- We supported Solar Turbines of Houston, TX on two proposals for cogeneration plants anchored by the Titan 130 gas turbine.
- We supported TransAlta on the Chihuahua Combined Cycle Plant in the state of Chihuahua, Mexico for the preparation for the plant performance test consisting of component tests of the gas turbines, HRSG's, and the steam turbine generator, in addition to a PTC 46 overall test. This is a 259 MW, 2x1 ABB 11N2 combined cycle plant complete with inlet fogging, duct firing in the HRSG's and an air-cooled condenser. It is a single fuel plant on natural gas.
- Received QF Status from FERC for a 60 MW net waste fuel to energy plasma gasification power plant for Alabama to convert MSW, sewage sludge, & tires to electricity and thermal energy streams.
- We started review of the combined cycle performance test procedures for the Gaza Power Plant
- We prepared Heat & Mass Balances for a 250 MW, 1x1 combined cycle power plant in Jordan.
- We submitted performance calculations for a 500 MW power plant in Baghdad, Iraq consisting of 10 LM6000 PC gas turbines.
- We prepared conceptual design of the 500 MW power plant in Baghdad, Iraq which contract has been awarded to our client.
- We submitted the conceptual design of a cogeneration plant consisting of a gas turbine and HRSG for NRG Energy in Queensland, Australia.
- We submitted detailed performance analysis of a 45 MW cogeneration plant with 16,000 pph of steam export in NY and, a 13 MW cogeneration plant in CA for NRG Energy

- We prepared conceptual design comparisons of 2x1 GE 7FA and 2x1 SW 501FD combined cycle power plant designs. Models have been created for evaporative cooling, steam injection of the gas turbine and duct firing of the HRSG.
- We prepared calculations to evaluate the power and heat rate of a cogeneration plant in New York to improve dispatch for our client.
- We completed calculations for a 650 MW, 2x1 combined cycle proposal for California.
- We began thermodynamic cycle support for a 330 MW, simple cycle power plant in California.
- We visited an 1100 MW, 4x4 combined cycle power plant to prepare thermodynamic evaluation and efficiency improvements.
- We began work to support the development of an integrated gasification cogeneration power plant.
- We began consulting to support the technical aspects of enhanced combustion technology for reciprocating engine generator sets fired on #2 & #6 fuel oil.
- We prepared the conceptual designs for 4x2 GE 9E, 3x2 V94.2, and 2x1 Alstom 13E2 combined cycle power plant for the Middle East.
- We prepared preliminary conceptual design for a gasification plant to convert lignite to syngas for use in gas turbines and boilers for a cogeneration plant in Germany.
- We prepared conceptual design work on the 2x1 Alstom 13E2 combined cycle plant in the Middle East.
- We evaluated the power plant assets of an international operating company to assist our client in the acquisition of the assets.
- We prepared the conceptual design of a LM6000 PC Sprint based cogeneration plant near Mexico City.
- We traveled to the Dominican Republic to review a diesel engine generator power plant fueled on #6 fuel oil to assess requirements for a performance test.
- We prepared the conceptual design and performance calculations for a Solar Turbine Titan 150 and 250 based power plant in Australia.
- We began the bid evaluation for the supply & installation of new HP & IP rotors and inner shells of a 600 MW steam turbine in a coal fired power plant. We reconciled the bids to the RFP and prepared summary performance comparisons. In addition, we prepared NPV and LD calculations for the commercial evaluation of the bids to support our recommendation for the successful bidder.
- We qualified as an "Expert Witness" for the plaintiff in an insurance claim for an 185 MW combined cycle power plant in the Caribbean. We prepared performance models, discounted value calculations, and participated in depositions.
- We prepared a conceptual design study of performance, equipment list, and cost estimate of an 180 MW coal fired power plant in Colombia complete with 20 km of double circuit transmission line.
- We modeled an ABB 11D5 gas turbine for repowering of an old combined cycle plant to a simple cycle peaking plant complete with CO catalyst and SCR.
- We evaluated the conversion of a simple cycle power plant to a 120 MW combined cycle cogeneration power plant in Rowley, Utah.
- We supported the performance testing of a 2000 kW Caterpillar diesel fueled engine generator in Hawaii.

- We prepared H&MB's and initial cost estimate for 185 MW coal fired plant in South America.
- We prepared due diligence review of a coal fired plant in the Philippines.
- We were the owner's performance test representative for a simple cycle plant in Peru.
- We prepared conceptual design of a 2x1 500 MW combined cycle plant in Turkey.
- We prepared conceptual design of 2x150MW & 2x75MW coal fired plants in Central America.
- We prepared conceptual design of 2x1 GE9E combined cycle power plant in Ghana.
- We prepared conceptual design of 4x1 OGT25000 combined cycle power plant in Ghana.
- We prepared performance testing procedure and correction curves for LM6000PC SC plant in Kuwait.
- We prepared conceptual design of 2x1 GE9E combined cycle power plant in Lebanon.
- We prepared conceptual design of 2x1 GE9E combined cycle power plant in Nigeria
- We prepared a thermodynamic model of the University of Iowa CHP plant.
- We prepared a thermodynamic model of a power system in Canada.
- We prepared a thermodynamic model of a power system in Azerbaijan.
- We reviewed the operation & performance of a 120MW engine generator plant in Jamaica.
- We are developing a plasma gasification plant to convert MSW to diesel in East Texas.

GAS TURBINE EXPERTISE

We have extensive experience in the conceptual design, performance evaluation, procurement support, and performance testing of the following gas turbine engines:

- **ABB Alstom:** 11N2, GT 10
- **General Electric:** GE 6B, GE 7B, GE 7EA, GE 7FA, GE 9FA, GE 9FA+, & GE 9FA++, LM6000 PA, LM6000 PC, LM6000 PC Enhanced Sprint, LM2500 DLN
- **MHI:** 301, 501B, 501F, 501G
- **Siemens:** V84.3A, V94.2 501FD1, 501FD2, & 501FD3
- **Solar Turbines:** Saturn, Taurus 60, Taurus 70, Mars 90, Mars 100, Titan 150 & Titan 250
- **Westinghouse:** W501B, W501D, W501D5, W501D5A, W501F, W501FD, W501FD2, W501FD3, W701

BOILER & HRSG EXPERTISE

B&W	Rankine Cycle from 355 psig to Supercritical Once-Thru 750 MW
Foster Wheeler	Rankine Units from 2400 psig to Supercritical Once-Thru 565 MW
CE	Rankine Units from 2200 psig to Supercritical Once-Thru 565 MW
Nooter-Eriksen	HRSG's, Triple Pressure Non-Reheat; Two Pressure Non-Reheat
ABB/CE	HRSG's, Triple Pressure Reheat
Alstom	HRSG's, Two Pressure Non-Reheat
IST	OTSG's, Once-Thru Steam Generators
Vogt/NEM	HRSG's, Triple Pressure Reheat
ERI	Max Fire HRSG's, Single Pressure
ABCO	HRSG's, Single Pressure

OWNER'S CONSULTANT FOR GAS TURBINE-BASED POWER PLANT PERFORMANCE TESTS

Campeche, Mexico	1x1 MHI 501F Combined Cycle Power Plant
Chihuahua, Mexico	2x1 ABB 11N2 Combined Cycle Power Plant
Cuiaba, Brazil:	2X1 Siemens V84.3A Combined Cycle Power Plant
Gaza, Palestine	2 Blocks of 2x1 Alstom GT10 Combined Cycle Power Plant
Thompson's, Texas	2x1 GE 7FA Combined Cycle Power Plant
Dominican Republic	1600 kW Diesel Engine Generator Plant
Hawaii	2000 kW Diesel Engine Generating Plant
Chilca, Peru	1x0 Siemens 501FD2 Simple Cycle Gas Turbine Generator
Kuwait	6x0 GE LM6000PC Simple Cycle Gas Turbine Generators

OWNER'S CONSULTANT FOR MERGER & ACQUISITION OF POWER PLANTS

United States	3000 MW of gas turbine based power plants in California, Illinois and Texas
International	Brazil, Dominican Republic, Guatemala, Nicaragua, Panama, Poland, Turkey, Philippines

EXPERT WITNESS TESTIMONY

We provided engineering evaluations of reduced power plant performance on a Power Purchase Agreement (PPA) and qualified as an Expert Witness for the plaintiff. We testified in deposition to discuss the diminished valuation of the power plant due to equipment failures by certain vendors to support the plaintiff's claim for damages due to the shortfall of power generating revenue.

QUALIFICATIONS OF PRINCIPAL

Gary Bush, Managing Partner, BUSH POWER GROUP LLC
B.S. Mechanical Engineering, Texas A&M University, 1968

Mr. Bush has over 42 years of diversified mechanical & electrical engineering experience in gas turbine-based simple cycle, combined cycle, and cogeneration plant conceptual design, project management, project engineering, start-up, construction, operations and maintenance in IPP, utility gas fired Rankine cycle power plants, and integrated petroleum-producing facilities.

He managed the development of hundreds of proposals for world-class size combined cycle power plant supervising proposal engineering managers, cycle design engineers, water treatment specialists, and senior mechanical engineers. He has also managed the design and construction of multiple capital projects from proposal to completion including development, scope-of-work, contract development, bidding, negotiations, change orders, and closeout. In one assignment, he assumed project management of seven (7) major electrical facilities being constructed simultaneously.

01/02 to Present: BUSH POWER GROUP LLC, The Woodlands, TX
Principal Consultant

02/95 to 12/01: ENRON ENGINEERING & CONSTRUCTION, Houston, TX.
General Manager, Conceptual Design & Performance Engineering

Responsible for the conceptual design and performance testing of Enron's combined cycle, cogeneration, and simple cycle gas turbine projects worldwide.

- Direct the development of initial performance screening, site weather data analysis, cycle configuration, heat & material balances, process flow diagrams, new & clean performance, plant degradation, power & heat rate guarantee values for performance test, power & heat rate values for use in development pro forma, NPV analysis, and liquidated damage calculations.

- Review design basis documents, scope of work, power purchase agreements, fuel supply agreements, specifications, and turnkey contracts. Coordinate with development, project management, contracts, legal, and engineering.
- Prepare analysis of gas turbine, HRSG, and steam turbine vendor quotations and performance.
- Review all capital equipment purchase contracts, specifications, terms & conditions, & LD's.
- Recommend changes in cycle designs to improve power and heat rate.
- Directed Site Signature Studies for Eli Lilly & Company for the utility plants.
- Directed design, procurement and installation of inlet fogging system for 2 GE 9FA gas turbines in India.
- Implemented cycle design improvements to optimize cooling systems, prevent cold end corrosion from sulfur bearing fuels, inlet fogging of gas turbines, and inlet chilling of gas turbines with "chill" from LNG vaporization.
- Supervise the preparation of site performance test procedures, site performance tests, and test reports.
- Proficient on GT Pro, GT Master, Steam Pro, Steam Master, Re-Master & Thermoflex for cycle design.

Specific Projects Developed and Tested:

- 507 MW 2x1 W501F Integrated LNG Fueled Combined Cycle Cogeneration Plant, LNG/LPG/#2 FO, in Puerto Rico
- 120 MW 2x1 GE6B Combined Cycle Cogeneration Plant, NG/#2 FO, in Poland
- 500 MW 2x1 V84.3A Combined Cycle Plant, #2FO/NG, in Cuiaba, Brazil
- 480 MW 2x1 V94.2 Combined Cycle Plant, LNG/#2FO, in Turkey
- 780 MW 2x1 GE9FA++ Combined Cycle Plant, NG in Sutton Bridge, UK
- 85 MW 2x1 MAN Slow Speed Diesel Combined Cycle Plant in Guam
- Year 1999 Simple Cycle Peaking Plants in Southeastern U.S. at 3 sites
- Year 2000 Simple Cycle Peaking Plants in Midwestern U.S. at 5 sites
- 780 MW 2x1 GE9FA CC Power Plant, Naphtha/#2FO, in Dabhol, India
- 150 MW 3x1 GE6B Combined Cycle Power Plant, NG/#2FO, in Panama
- 120 MW 4x2 ABB Combined Cycle Power Plant, NG/#2FO, in Gaza
- 600 MW 2x1 GE7FA Combined Cycle Power Plant, NG, in Texas

1994-1995: ENRON CORP, Houston, TX, Project Engineering Manager

08/94-02/95: Assisted in the development of a LNG, LPG, and diesel fueled Combined Cycle Cogeneration Power Plant Project in Penuelas, Puerto Rico consisting of two 1 million barrel LNG storage tanks, vaporization equipment, two Frame 7 advanced gas turbine generators (160MW), two 900 kpph HRSG's w/duct burners, one 200MW steam turbine generator, 18kV/230kV substation, 4 MMgpd desalination plant, and 3 miles of 230kV power line.

1988-1994: SOLAR TURBINES INCORPORATED, Houston, TX, *Project Engineer*

05/93-08/94: Responsible for the project engineering and proposal development of the Menasha Cogeneration Plant in Otsego, MI consisting of 2 Solar Mars T-15000, 10 MW gas turbine generators, 180kpph HRSG's w/duct burners, 200kpph package boiler, 46kV/13.8kV outdoor substation, 13.8kV switchgear, 480V switchgear, building, water treatment, and boiler feed system.

05/91-04/93: Responsible for the project engineering, construction, and start-up of the Maraven Lama Power Generation Project on Lake Maracaibo, Venezuela, consisting of 5 Solar Centaur "H", 3500 kW gas turbine generators, control room, fuel gas system, fire & gas detection system, firewater system, instrument air system, 500 kW emergency diesel generator, 11.5 kV switchgear, 5kV switchgear, 480 volt switchgear, and central control panel.

07/90-04/91: Responsible for developing computerized scheduling of the State Energy Commission of Western Australia (SECWA) project consisting of 6 Solar MARS gas turbine driven compressor sets installed at four different compressor stations. A total of 16 integrated schedules were developed comprised of turbine compressor manufacturing, USA source materials, Australian source materials, construction at each station, and management overview schedules. Changes in one schedule would be reflected in all related schedules automatically.

11/89-06/90: Designed & developed engineering and construction proposals for cogeneration projects at Hoechst Celanese in New Jersey; Merck Pharmaceutical in New Jersey; General Mills in Ohio; Ralston Purina in New York. Each project consisted of one or more Solar gas turbine generator sets, waste heat boilers, switchgear, and controls.

10/88-10/89: Responsible for the engineering design and construction of the Warner-Lambert Cogeneration Project, Ann Arbor, Michigan, consisting of a Solar Centaur T-4500, 3,000 kW gas turbine generator and 50,000 lb/hr waste heat recovery boiler with 32 MMBTU/hr duct burner. Project also included 25,000 gallon fuel oil storage tank, expansion of existing powerhouse, tie-in to 4800 volt bus, 480 volt motor control center, redesign of the 265/125/15 psig steam pressure reducing stations, and computerized energy accounting system.

1982-1988: COENERGY SYSTEMS COMPANY, Houston, TX, *Principal Consultant*

- Developed proposals and designs for packaged cogeneration systems consisting of desiccant dehumidification HVAC units and natural gas-fired engine generator sets. Analyzed annual energy bills and HVAC systems and recommended energy savings equipment and systems.
- 1986-1987: *Engineering Consultant*, Performed spring hanger and expansion joint inspection on 1987 turnaround of FCCU refining unit.
- 1984-1986: *Engineering Consultant*, Hot-Hed is an oil field product sales and service company for the turnkey installation of wellheads. The Hot-Hed is a patented exothermic wellhead preheating and stress-relieving device. Developed the welding procedures for joining 4130 & 4140 heat-treated wellheads to all types of API pipe and casing. Analyzed wellhead failures and recommended new procedures.
- 1983-1984: *Principal*, Researched & developed process flow design for a 20+MW cogeneration project for Houston Lighting & Power Company consisting of a fuel gas pressure reduction turbo expander generator and a waste heat recovery power generating system utilizing an organic Rankine cycle with no fuel cost within an existing HL&P power plant. Prepared computerized analysis of cogeneration system for cash flows, return on investment, and discounted cash flows.
- 1983: *Engineering Consultant* on the ARAMCO Safaniyah-Khafji Onshore Crude Expansion Project. Assisted in the area electrical power study for a 230kV/115kV underground power system with SF6 substations. Calculated system loads, cable sizes, transformer sizes, emergency loads, and battery and inverter sizes. Developed project engineering specifications for electrical equipment.
- 1982-1983: *Engineering Consultant*. Developed engineering specification for a computerized machinery monitoring and analysis system for large rotating equipment trains consisting of GE, Westinghouse, Mitsubishi, and John Brown gas turbine driven generators, compressors, and pumps. Wrote high performance coupling specification to resolve coupling & gearbox failures in RLPG Plant 59, Ras Tanura, Saudi Arabia.

1979-1981: AMERADA HESS OIL CORPORATION, New York, NY, *Project Manager* Water Injection Project, London, ENGLAND, Promoted from Technical Services Supt. on Arzanah Island, Abu Dhabi, to supervise and coordinate project design team activities of Davy McKee Oil & Chemical, Ltd., on a 100,000 BPD, 3,000 psig seawater treatment and injection facility.

- *Superintendent, Technical Services Department*, Arzanah Island, Abu Dhabi, Responsible for operations and maintenance engineering on eleven offshore wells, 60,000 BPD offshore production platform, island processing plant, and captive supertanker.
- *Superintendent of Power & Utilities*, Arzanah Island, Abu Dhabi, Responsible for five 2.8 MW Ruston gas turbine generators; four 50,000 gpd desalination units, HVAC, plant air, and 7 electrical substations. Supervised 20 employees.

1974-1979: ARAMCO, Ras Tanura Refinery, Saudi Arabia

- *Technical Advisor*, Utilities Division. Reported to Utilities Superintendent on problems concerning area electrical generation and distribution, new project design, project construction, new facility commissioning, and special maintenance projects. Major responsibility was gas turbine availability improvement.
- *Foreman, Electric Generation and Distribution*, Responsible for the operation of 265 MW power plant and electrical system consisting of five (5) steam turbine generators (four GE, one Brown Boveri), five (5) gas turbine generators (three MHI-301 34 MVA, one MHI-501 66MVA, one Westinghouse 501, 144 MVA), area electrical distribution (115kV, 69kV, 13.8kV, 4160V, 2400V, 480V, 208/120), switching procedures, training, and maintenance coordination. Supervised 50 employees. Budget responsibility.
- *Construction Engineer*, Northern Area Power System Distribution Projects, Responsible for establishing division office and the construction of 115kV, 69kV, 13.8kV power lines, substations, and village power systems in the Eastern Province of Saudi Arabia.
- *Commissioning Engineer*, Project Management Gas Turbines, Responsible for commissioning and start up of three Mitsubishi 501, 66MVA gas turbine generators at Juaymah, Safaniyah, and Ras Tanura Refinery Power Plants. Commissioned ARAMCO's first breaker and one-half 115kV substation at Safaniyah.
- *Construction Engineer*, Project Management Gas Turbines, Responsible for the construction of the Juaymah No. 3 gas turbine generator, MHI 501 66MVA GT and 50 MMSCFD fuel gas compressor facility. Budget responsibility and contractual proceedings from draft to closeout.

1970-1974: HOUSTON LIGHTING & POWER, Houston, TX,

- 1973-1974 *Project Engineer* Responsible for coordinating the design and construction by Brown & Root of HL&P's first coal-fired twin 700 MW steam electric station.
- *Boiler Maintenance Engineer*, Supervised 16 to 25 men in traveling boiler maintenance activities during annual inspections and emergency work on 42 boilers in ten plants, 365 to 4300 psig and 1MW to 750 MW capacity.