

# BRIDGESTONE ASSOCIATES, LTD.



Energy and Infrastructure  
Consulting Services



Energy Consulting that Works for YOU



## ENERGY CONSULTING SOLUTIONS

Our consulting services include:

- ENERGY PROJECT FEASIBILITY STUDIES.
  - ◆ CHP, CCHP, IPP, DG
  - ◆ Microgrids
  - ◆ Renewable & Alternative Energy Projects
  - ◆ Standby & Backup Generation
  - ◆ Life Cycle Valuation of Existing Plants
- ENERGY PROJECT DEVELOPMENT.
  - ◆ Greenfield to complete project development
- ENERGY PROJECT DESIGN.
  - ◆ Conceptual, Preliminary, Detailed
  - ◆ Review of existing design
- ENERGY AUDITS & PROCESS OPTIMIZATION.
  - ◆ Preliminary and Detailed
  - ◆ Industrial, Commercial, Institutional
  - ◆ Manufacturing Energy Sales Tax Studies
- ENERGY TECHNOLOGY ASSESSMENT.
  - ◆ Evaluation of New and Emerging Technologies
- ENERGY MANAGEMENT & PROCUREMENT.
- GRANT WRITING & EVALUATION.
  - ◆ Energy & Infrastructure Capital Grants
  - ◆ New and Emerging Technologies

## Consulting Services that Work for YOU

BRIDGESTONE ASSOCIATES, LTD. is a specialized consulting firm that provides services on the production, use and management of energy. BRIDGESTONE ASSOCIATES has been providing these consulting, advisory and design services to a wide range of industrial, commercial, institutional and governmental clients for more than 28 years. Our primary focus is on the reduction in energy costs and carbon emissions; the improvement of energy efficiency; and the development of efficient, resilient, environmentally friendly energy generation and supply solutions.

## Hands on industry experience

### OUR CONSULTANTS AND SPECIALISTS PROVIDE REAL WORLD EXPERIENCE TO SUPPORT YOUR BUSINESS GOALS

Our team of consultants and specialists have “hands on” experience in a wide range of industries as well as power generation facilities, so the consulting advice and services you receive are based on real world experience, not just theoretical book recommendations. Our experience often allows us to challenge the status quo and the “we have always done it that way” mentality, to help develop the best, most cost effective and efficient approaches that save energy, lower costs, and provide long-term solutions.

### ENERGY CONSULTING & ADVISORY SERVICES

Bridgestone Associates, Ltd. provides a comprehensive range of consulting and advisory services to the users, marketers and producers of energy as well as to owners and operators of energy projects, equipment and service providers, and financial institutions involved in the energy market. These services include:

- Renewable energy, independent power plant (IPP), Combined Heat and Power (CHP), Combined Cooling Heat and Power (CCHP), cogeneration, microgrid, distributed generation, waste-to-energy, bio-fuels and other energy facility feasibility evaluations, equipment selection, design, development and operations
- Energy auditing, evaluation and benchmarking of energy use and consumption efficiencies, analyses of existing and alternative tariffs, energy management strategy and utilization planning
- Financial, economic, life-cycle cost analysis, and technical modeling of energy and infrastructure projects
- Sustainability and carbon reduction consulting
- Grant writing and submission
- Energy and infrastructure project acquisition and investment due diligence
- Technical and economic evaluation of new technologies
- Process and production systems assessment and optimization
- Strategic, business and market planning and business development
- Environmental permitting and regulatory compliance
- Energy Procurement

## EXPERIENCE THAT COUNTS

BRIDGESTONE ASSOCIATES has over 28 years of experience in energy project consulting, project development, and energy efficiency analysis. During this time we have performed on over 250 projects totaling over 21,500 MW of power generation and conducted energy efficiency audits on over 25 million square feet of commercial, industrial and institutional facilities.

Our experience encompasses all types of generating plant configuration including Combined Heat and Power (CHP or cogeneration), Combined Cooling Heat and Power (CCHP or tri-generation), IPP, microgrids, distributed generation, and standby and back-up generation.

We have worked on projects with all types of generating equipment including combined and simple cycle combustion turbine plants, steam turbines, micro turbines, reciprocating engines, hydro, wind, solar (PV and CSP), and Organic Rankine Cycle (ORC). These have used a wide range of traditional and alternative fuels including natural gas, coal, waste coal, oil (No. 2 and HFO), methanol, refinery gas, coke oven gas, digester gas, biomass (orchard prunings, whole tree chips, agricultural waste, cashew nut hulls, rice husks, bagasse, miscanthus, etc.), digester gas, waste heat and other wastes.



## SUSTAINABILITY & CARBON FOOTPRINT REDUCTION

Because of our experience in the production, use and utilization of energy, and in ancillary areas related to energy use and production such as waste water treatment, municipal solid waste (MSW) disposal, and water management, Bridgestone Associates can offer clients a range of services related to sustainability and carbon footprint reduction. We understand and are experienced in both how energy is produced and in how energy is used. Unlike many firms whose focus is on the sustainability of energy use (the demand side), we understand and are experienced also in the ways to improve the efficiency of energy production, the use and utilization of renewable and sustainable energy resources and the use of emerging technologies to provide sustainability and minimize carbon emissions.

- Determination of existing carbon footprint
- Development and implementation of carbon footprint reduction plans and strategies
- Identification and evaluation of emerging technologies related to energy production and use
- Design and evaluation of sustainable and renewable energy generation facilities
- Development of designs for waste water and agricultural waste nutrient management
- Preparation of grants applications for funding of sustainability and carbon reduction projects

## PROJECT DEVELOPMENT

The Company's principals have been directly involved in the development of numerous renewable energy projects, independent power plants, CHP, co-generation, microgrids, bio-fuels and other energy facilities throughout the USA and the world. This experience and knowledge is used to take a lead or supporting role in the identification, evaluation, development and implementation of energy related projects.

- Project development from concept to completion
- Conceptual, preliminary, and detailed project design
- Permitting, licensing and regulatory approval
- Financing and economic modeling
- PPA, ESA, Interconnection and fuel supply agreement negotiations
- Contractor identification and selection
- Project oversight, management, equipment procurement and "Owner's Engineering" services



## EXPERIENCE THAT COUNTS (cont.)

Over the past 28 years we have performed energy audits and energy efficiency studies at all levels from simple “walk through” audits to ASHRAE Level II and Level III audits. Over this time we have audited more than 25 million square feet of industrial, commercial and institutional facilities. Audited facilities include wastewater treatment plants, water pumping facilities, hospitals and healthcare facilities, schools and universities, multifamily residential facilities, commercial office buildings, food processing and food manufacturing plants, cement manufacturing, metals processing, and commercial printing.

As part of our energy auditing practice, we have conducted numerous Manufacturing Energy Sales Tax studies to reduce sales taxes paid on energy used in manufacturing.



## DESIGN, TECHNICAL & ENGINEERING SERVICES

Careful design of facilities can be critical to the overall usage of energy and the costs of operations. Often designs are based on least cost or first cost criteria, taking little account of life-cycle and long-term energy related costs. The ability to understand existing or planned operations and to develop practical, cost effective and energy efficient designs is critical to long-term success of most facilities. The careful and experienced design of energy production facilities is also critical to their long-term cost of operations and their ability to perform in a competitive marketplace. Careful selection of new or replacement equipment, taking account of the desired operational requirements of the facility is also a key to long-term viability.

Bridgestone Associates provides a comprehensive range of facility design and re-design services for energy production and energy using facilities.

- Preliminary and detailed design and equipment selection of renewable energy, CHP, CCHP, co-generation, IPP, microgrid, waste-to-energy and bio-fuels facilities
- Design of peak shaving and stand-by power systems
- Design of chiller, boiler and central utility plants for commercial and industrial companies
- Evaluation of existing production and utilities systems to determine suitability of design, potential efficiency improvements and design improvements to reduce energy consumption
- Design of energy management and monitoring systems
- Technical due diligence on planned or existing energy facilities prior to or during operations for investment or financing purposes

## GRANT WRITING AND ASSESSMENT

With its extensive experience in energy and infrastructure project design and development, Bridgestone Associates Ltd. has helped numerous clients prepare and submit successful applications for grants and other incentive funding of wide range of projects. These have included projects for Combined Heat and Power (CHP) plants, waste energy plants, energy efficiency studies, pollution prevention studies and for new buildings. Many of the grant applications have been for funding of demonstration projects for new or evolving technologies including fuel cells, Organic Rankine Cycle (ORC) systems, micro turbines, and specialized de-watering and filtration technologies. As experts in the application of energy efficiency and power generation technologies, and in the development of energy related projects, the Company has also been engaged by grant providers to assist in the review and grading of grant applications they have received.

- Identification of grant and other incentive funding opportunities.
- Determination of requirements for submission and identification of success criteria.
- Management of the application preparation and submission process.
- Writing and editing of written text, preparation of all drawings, spreadsheets and other support materials required for a grant application.
- Research on information and data to support grant applications.
- Physical preparation and submission of the grant or incentive funding application.
- Review and grading of completed grant applications for state and federal agencies.

## EXPERIENCE THAT COUNTS (cont.)

In addition to our power generation and energy auditing expertise and experience, our general industry and business consulting experience includes preparation and submission of multiple successful capital grant funding applications to State and Federal agencies for energy and infrastructure projects and new technologies. We have also been contracted multiple times by State and Federal agencies to review and score similar grant and funding applications for energy projects and new technologies.

Over the years many of our clients have relied on BRIDGESTONE ASSOCIATES to help support their general business management and development. This means we have prepared numerous business and marketing plans, led or participated in project sales and negotiations, prepared numerous client proposals and reports, trained client personnel, testified on behalf of clients in State agency hearings, and even prepared client annual reports. Our clients consider us an integral part of their team.



### ENERGY AUDITS, OPERATIONS ANALYSIS & DEMAND SIDE SERVICES

Analysis of existing operations, operational methodologies and practices, and manpower assignments can lead to determination of ways in which overall facility operations costs may be lowered. Benchmarking of existing operations, costs and energy utilization against similar facilities can also provide valid guidance on possible opportunities for cost reduction.

Simple measurement and analysis of existing utilization of energy can often lead to development of strategies or replacement of equipment and systems to lower energy use. Facility systems are often found to be poorly designed for their current purpose, poorly maintained or out-of-date relative to newer, more efficient systems. Systems were often designed with “first cost” in mind, not long-term energy utilization and costs. Measurement, analysis and auditing provide technical and economic justification for changes in design and equipment.

Energy use may often be reduced through simple operational and behavioral changes. These changes can usually be implemented with minimal cost. Suitably designed and implemented behavioral programs and plans can result in significant energy savings.

Bridgestone Associates provides a range of services related to the analysis of operations, auditing energy use and developing the necessary plans to reduce costs.

- Analysis and benchmarking of existing operations, operational methodologies and manpower usage
- Preliminary and detailed energy audits on a system-by-system and/or facility wide basis
- On-site measurement and verification of energy use, losses, wastage, etc.
- Identification of demand-side energy reduction strategies, system changes and equipment replacement
- Identification and analysis of behavioral changes
- Design of energy management and awareness plans
- Economic and technical justification studies
- Contractor selection and management
- Verification of savings programs



## EXAMPLES OF SOME OF OUR RECENT PROJECTS

Over the past 28+ years, Bridgestone’s team of consultants and specialists has worked on over 250 projects ranging from energy efficiency and industrial process optimization studies and audits for manufacturing energy use sales tax exemption, to feasibility studies and design of microgrids, renewable power projects, small and large combined heat and power (CHP) and Independent Power Plants (IPP), to preparation of business and marketing plans and preparation and evaluation of grant applications for energy projects and new technologies. The following are examples of some of these projects:

### COMBINED HEAT AND POWER (CHP) PLANT & INDEPENDENT POWER PLANT (IPP) PROJECTS

- ◇ 545 MW Combined Cycle IPP, New Jersey, USA —Detailed Feasibility Study
- ◇ 5 MW Refinery CHP Plant, Lake Charles, LA, USA—Detailed Feasibility Study
- ◇ 720 MW Combined Cycle IPP, Calabar, Nigeria—Preliminary Feasibility Study
- ◇ 16 MW Food Manufacturing CHP Plant, Cedar Rapids, WI, USA— Detailed Design
- ◇ 42 MW Paper Mill CHP Plant, W Monroe, LA, USA—35% Design
- ◇ 2.3 MW Manufacturing Plant Waste Heat CHP Plant, St Marys, PA, USA—Capital Grant Application and Detailed Design
- ◇ 700 MW Combined Cycle IPP, Abuja, Nigeria—Preliminary Feasibility Study
- ◇ 160 MW Industrial Plant and District Heating System CHP Plant, Dnipropetrovsk, Ukraine—Detailed Feasibility Study
- ◇ 15 MW Brewery CHP Plant, Rio de Janeiro, Brazil—Acquisition Evaluation
- ◇ 25 MW Paper Mill CHP Plant, Kalamazoo, MI, USA—Preliminary Used Equipment Feasibility Study
- ◇ 130 MW Combined Cycle IPP, Corinth, NY, USA—Comprehensive Valuation Study
- ◇ 12 MW Cannabis Grow Facility CHP Plant, Pueblo, CO—Detailed Feasibility Study
- ◇ 54 MW Combined Cycle, Palo Alto, CA, USA—Comprehensive Valuation Study and Equipment Salvage Project Management
- ◇ 28 MW HFO IPP Plant, Bushrod Island, Republic of Liberia—Detailed Study and Early Stage Development
- ◇ 10 MW HFO IPP Plant, Segou, Republic of Mali—Detailed Study and Early Stage Development
- ◇ 20 MW Auto Manufacturer CHP Plant, Baltimore, MD, USA—Detailed Feasibility Study and Utility Bid Preparation
- ◇ 18 MW Food Manufacturer Coal Fired CHP Plant, Dover, DE, USA—Acquisition Due Diligence
- ◇ 5 MW Hospital CHP Plant, Baltimore, MD—Preliminary Feasibility Study
- ◇ 500 kW Corrugated Box Manufacturer CHP Plant, York, PA, USA—Preliminary Feasibility Study

### ENERGY EFFICIENCY AUDITS, PROCESS OPTIMIZATION STUDIES, & MANUFACTURING ENERGY USE TAX STUDIES

- ◇ Food Manufacturing Plant, Muncy, PA, USA—Energy Efficiency Audit, Manufacturing Energy Use Sales Tax Audit, and Bakery Oven Waste Heat Recovery Study
- ◇ Wastewater Treatment Plant, Centreville, VA, USA—Comprehensive Energy Audit, Benchmarking Study, and Process Optimization Study
- ◇ City Facilities, Pittsburgh, PA, USA—Comprehensive Energy Audit
- ◇ Meat Processing Plant, Wyalusing, PA, USA—Preliminary Energy Audit
- ◇ School District, Chester Upland, PA, USA—Comprehensive Energy Audit
- ◇ Commercial Printer, Breinigsville, PA, USA—Manufacturing Energy Sales Tax Audit and Preliminary Energy Efficiency Audit
- ◇ Cement Manufacturing Plant, Leamington, UT, USA—Comprehensive Energy Efficiency Audit and Process Optimization Study
- ◇ Water Treatment Plant, Pittsburgh, PA, USA—Comprehensive Energy Audit
- ◇ Cement Manufacturing Company, Tucson, AZ, USA—Comprehensive Energy Efficiency Audit and Process Optimization Study
- ◇ Soap Manufacturing Plant, Baltimore, MD, USA—Comprehensive Energy Audit
- ◇ Residential and Day Campus Style Mental Retardation Institute—Comprehensive Energy Efficiency Audit
- ◇ State Water & Wastewater Treatment Facilities, Sao Paulo, Brazil—Comprehensive Energy Audit and Benchmarking Study
- ◇ University Campus, Chester, PA, USA—Comprehensive Energy Efficiency Study
- ◇ Multiple City Buildings, Binghamton, NY, USA—ASHRAE Level II Energy Audits
- ◇ Metals Processing Facility, Towanda, PA, USA—Preliminary Energy Audit
- ◇ Helicopter Manufacturing Facility, Perkasio, PA, USA—Manufacturing Energy Sales Tax Audit and Preliminary Energy Efficiency Audit
- ◇ Wood Products Manufacturing Facility, Towanda, PA, USA—Preliminary Energy Efficiency Audit and Utilities Cost Analysis
- ◇ Electronic Component Manufacturing Facility, Etters, PA, USA—Manufacturing Energy Sales Tax Audit and Preliminary Energy Efficiency Audit
- ◇ Ice Cream Manufacturer, Framingham, MA, USA—Preliminary Energy Audit
- ◇ Spaghetti Sauce Manufacturer, Owensboro, KY, USA—Energy Efficiency Study

## EXAMPLES OF SOME OF OUR RECENT PROJECTS (continued)

### RENEWABLE & ALTERNATIVE ENERGY PROJECTS

- ◇ 200 MW Concentrated Solar Power (CSP) Plant with 3 Hours Molten Salt Storage, Colorado, USA —Preliminary Design and Detailed Capital Cost Estimate
- ◇ 50 MW Biomass (Whole Tree Chips) Fired IPP, Corinth, NY, USA—Detailed Feasibility Study and Early Stage Development
- ◇ 1 MW Fuel Cell Based CHP Plant, Wallingford, CT, USA—Conceptual Design
- ◇ 10 MW Solar PV, Delaware, USA—Preliminary Evaluation and Site Acquisition
- ◇ 69 MW Windfarm, Liberty, PA, USA—Site Location, Due Diligence and Site Acquisition. Early Stage Development
- ◇ 50 MW Biomass (Railroad Ties) Fired IPP, Vicksburg, MS, USA—Detailed Capital Cost Estimate to Salvage and Relocate Used Equipment from Multiple Sites. Project Scheduling and EPC Negotiations.
- ◇ 40 MW Biomass (Miscanthus) Fired CHP Plant, Dnipropetrovsk, Ukraine—Detailed Feasibility, Fuel Supply, and Environmental Study
- ◇ 10 MW Biomass (Cashew Nut Hulls) Fired CHP Plant, Fortaleza, Brazil—Preliminary Technical, Economic and Environmental Study
- ◇ 3 MW Solar PV, Central Pennsylvania, USA—Preliminary Evaluation for an Industrial Facility
- ◇ 450 Ton/Day Animal Manure Anaerobic Digester Plant, NY, USA—Business Plan Development, Conceptual Design, Capital Cost Estimating, Evaluation
- ◇ Multiple Solar PV Commercial and Institutional Facility Projects, NY, USA — Prepared detailed proposals and grant applications for multiple solar pv installations at commercial and institutional properties.

### MICROGRIDS & MULTIPLE DISTRIBUTED ENERGY RESOURCES PROJECTS

- ◇ Comprehensive Microgrid Study, Binghamton, NY, USA—Detailed study, design, capital and operating cost analysis of a microgrid in downtown Binghamton with seven connected users, a 1.4 MW combined heat plant, 600 kW Solar PV and 1.2 MW hydro.
- ◇ CHP and Microgrid Study, Los Angeles, CA, USA—Detailed evaluation of natural gas and landfill gas fired CHP, solar PV, and energy storage microgrid at large food manufacturing facility.
- ◇ Microgrid Study, Centreville, VA, USA—Preliminary evaluation of digester biogas fired CHP, solar PV and water outfall hydro microgrid at large wastewater treatment plant.

### GRANT APPLICATION PREPARATION AND GRANT APPLICATION EVALUATION

- ◇ US Department of Energy's (USDOE's) National Energy Technology Laboratory (NETL) - Review and evaluation of 140 capital grant applications under the American Recovery and Reinvestment Act (ARRA) for industrial energy efficiency, waste heat recovery, and combined heat and power applications.
- ◇ UTC Power, Windsor, CT, USA—Preparation of multiple successful capital grant applications for Organic Rankine Cycle generation projects in New York, New Jersey, and Pennsylvania.
- ◇ Clarkson University, Potsdam, NY, USA—Preparation of a \$5 million capital grant application to the National Institutes of Health (NIH) for a new research building.
- ◇ California Energy Commission (CEC) - Review and evaluation of multiple grant funding applications for small scale biomass
- ◇ US Department of Energy (USDOE) - Preparation of capital grant funding application for small scale Organic Rankine Cycle system to recover energy from hot water in a gold mine.
- ◇ New York State Energy Research and Development Authority (NYSERDA) - Preparation of grant application for development of animal manure water treatment nutrient removal technology.
- ◇ California Energy Commission (CEC) - Evaluation of grant applications for thin film solar technology commercialization.
- ◇ UTC Power, Windsor, CT, USA—Preparation of multiple successful grant applications in New York, Connecticut, New Jersey and Pennsylvania for microturbine

### MISCELLANEOUS PROJECTS

- ◇ Business Plan Preparation—Preparation of Detailed Business Plan for natural gas exploration and production company to develop, construct, own and operate combined heat and power (CHP) plants at commercial and industrial facilities.
- ◇ Business and Market Study—Detailed research and preparation of business and marketing plan to produce fuel grade methanol (97% methanol, 3% water) and sell as an alternative to No. 2 fuel oil for power generation equipment in areas throughout the World where natural gas or LNG was unavailable.
- ◇ Membrane Distillation Research Study—Research study with Sandia National Laboratories for EPRI on recovering usable and useful energy from 120—140 °F power plant cooling tower water using membrane distillation technologies.
- ◇ Utility Tariff Modeling—Developed detailed models of electric utility tariffs for a major national retail energy marketer's sales team. Prepared tariff models and analyzed historic utility cost data for dozens of their clients.

The projects shown on these pages provide examples of some of the over 250 projects Bridgestone Associates has undertaken over the past 28+ years and demonstrate the wide range technologies, the diverse nature of the clients, the wide range of project work scope, and the global nature of our work. For additional information on the specifics of any of these projects, please contact us.

## ABOUT BRIDGESTONE ASSOCIATES, LTD.

The **BRIDGESTONE ASSOCIATES** team includes seasoned specialists in all aspects of energy and utilities use, Certified Energy Managers, Professional Engineers, environmental permitting professionals and financial and business professionals. Each Team member is chosen for their experience and their ability to provide clients with reasonable, rational and cost effective solutions that will work, not theoretical, “pie-in-the-sky” ideas.

**BRIDGESTONE ASSOCIATES** is based in Chadds Ford, near Philadelphia in southeastern Pennsylvania, USA. Our specialists and consultants however are located throughout the USA, so we have a broad reach often unusual for a small specialist company. We have worked throughout North America and around the World on projects as diverse as wastewater treatment plant energy efficiency studies in Brazil, a gas and biomass fired combined cycle plant at a former Russian ballistic missile factory in Ukraine, HFO plants in Mali and Liberia, and two large combined cycle plants in Nigeria. Wherever and whatever the project, we select a qualified and experienced individual or team to complete the work. Most often this is from internal resources but we supplement those resources with outside specialists and consultants where and when needed. This allows us to undertake a wide range of projects while main-

taining reasonable overhead costs so we can offer our clients skilled services at very competitive rates.

**BRIDGESTONE ASSOCIATES** and its principals have a solid and long history in the evaluation, design and development of renewable energy and conventional fuel projects of all types and sizes. Evaluation, development and design of both conventional fuel and renewable energy projects requires the broad set of skills and capabilities that **BRIDGESTONE ASSOCIATES** possesses. These skills and the experience behind them have been applied numerous times to assist clients in evaluating and developing project opportunities. Whether natural gas, diesel, coal, wind, solar, biomass or hydro, many of the basic requirements are the same, and so after more than 28 years and over 250 projects, we are well practiced in applying the necessary skills to achieve the desired goals on time and in a cost effective manner.

Please contact us at the address and numbers below for more information or to discuss your project.

Thank you.

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