Promoting Resource Use at the Highest Level of Technical and Economic Efficiency

Willis ENERGY SERVICES LTD.

Corporate Profile

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Who We Are

We are an energy consulting firm offering engineering, regulatory, planning and public consultation services to utilities, independent power developers, and large energy users.

Our Function

We help our clients to manage costs, to improve energy use efficiency, and to develop profitable power projects.

Our Skills

We know the energy marketplace, have engineering experience, can manage energy projects and provide advice to Managers. We understand resource use, emerging issues and keep up to date on efficient technologies and sources of renewable energy. We have a good comprehension of utility planning, particularly as it relates to conservation and energy acquisition. Our team includes Professional Engineers, Strategic Planners, Certified Energy Managers, Environmental and Regulatory Experts.

Our Goal

Our Goal is to make every hour that we work valuable to our clients.

The following are examples of the types of Services that **Willis** provides.

Energy Use Auditing

Recording and monitoring consumption, usage patterns, and how these patterns vary according to building occupancy and industrial production. We provide the following assessment services:

- Collection and review of electric and gas meter data
- Billing analysis and verification
- Inventory of electric and gas equipment
- Metering of specific equipment
- Calculation of energy use intensities per building area and process use
- Ongoing monitoring of energy efficiency per building or process use

Energy Use Analysis

Detailed analysis of electricity and gas use to correct problems and improve efficiency. We offer the following analytical services:

- Peak demand determination and assessment
- Furnace and Boiler efficiency determination
- Pump and fan efficiency analysis
- End-use analysis (determination of energy consumption per use, i.e. lighting, HVAC, domestic water, process uses)
- End-use efficiency determination and improvement potential assessment

Energy Management Planning

Every large building and industrial site needs an energy management plan. **Willis** assists companies to develop, implement, and evaluate the plan. As well, we will be responsible for maintaining and implementing an energy management plan while our client can focus on their core business. The plan should include:

- a monthly forecast of energy use and costs for 1 to 5 years
- procedures for monitoring usage
- opportunities identified for achieving energy savings
- a schedule of investment for and implementation of efficiency projects

Willis uses the following sources as references in developing these plans: The Carbon Trust, The Association of Energy Engineers, The American National Standards Institute (ANSI), and SenterNovem.

Energy Pricing Contract and Risk Management

Willis provides assistance in determining risk tolerance, resource requirements, price expectations and in evaluating suppliers. We offer the following market assessment services:

- Regulatory briefing
- Contract service option analysis
- Bid Preparation and evaluation
- Contract negotiation
- Option sensitivity/risk assessment

Pricing Services

As the electricity markets become more active, the need to keep current on pricing and trends becomes more imperative. **Willis** provides a daily pricing sheet, which details the current price for both electricity and natural gas in appropriate markets, and when necessary explains significant deviations. In addition, **Willis** publishes a monthly ***Outlook Report*** that reviews electricity and natural gas prices for the coming month, and details what factors are likely to influence that price within the month. This report is of primary use for those customers wishing to use financial instruments or block purchases to reduce potential volatility of price under real time pricing.

Regulatory Review

Willis keeps current on the options for energy supply. As changes occur to tariffs, we advise our clients of the potential impact to their business and give feedback to regulators and other decision-makers. We evaluate supplier proposals and advise if these alternative options are appropriate for clients to pursue. **Willis** has successfully represented a number of clients in working group meetings and facilitated meaningful dialog with suppliers for our clients.

Independent Power Project Development (IPP)

Willis assists IPPs in the investigation and development of projects from an engineering, economic and power sales perspective. It has provided the following services to a variety of IPP developers:

Conceptual Project Development

This work involves analyzing the technical feasibility of a project and developing a preliminary cost of power estimate. An assessment can then be performed as to the probability of a project obtaining a sales contract at a price that would provide an adequate rate of return.

Bid Preparation

A variety of work is required to prepare a proposal in response to a utility Request for Proposals. **Willis** can assist in the Project Management of these activities as well as performing many of the specific engineering and financial analysis tasks.

Market Assessment

Willis is very familiar with the electricity and gas markets in the U.S. Pacific Northwest, Alberta and British Columbia. They understand the Utilities and the potential IPP projects that could be developed and accordingly, can provide a competitive market assessment with respect to a specific project.

Contract Negotiation and Administration

Willis has experience both from the Utility perspective and from the IPP perspective in the development and administration of Electricity Purchase Agreements. They understand the contract nuances that can ensure successful business arrangements for the purchaser and buyer of power.

Utility Planning Service

Willis has been working with a variety of utilities in the following areas:

- Demand Side Management Programs
- Energy purchasing arrangements
- Rate design, determining what rates are necessary to cover the utilities costs
- Restructuring (metering and billing systems, and energy cost reductions)
- Contracting out services

Load Forecasting

Primary to any resource management/acquisition decision is "How much will be needed?" A load forecast provides estimates of future use, identifies changes in resource requirements, and highlights uncertainties around those changes. The forecast can be used to assist planning for different potential outcomes. Our experience with end-use technologies combined with our economic analysis and modeling capabilities, place **Willis** in the unique position of being able to present load forecasts based on both economic and end-use projections and can provide useful services both to utilities and large end-users.

Conservation Potential Studies

Energy efficiency in any building, complex or industrial site can always be increased, but at what cost? We will provide conservation potential studies for industrial sites and individual buildings as well as conservation potential studies. The studies involve financial analysis comparing cost of specific efficiency improvements to electricity and natural gas rates and consumption. For utilities, resource comparison includes comparing investment in conservation with the marginal cost of new supply resources.

Cogeneration Potential Studies

Any industrial site or building complex that requires large amounts of process heat and electricity should consider cogeneration. In the production of steam or hot water, electricity can be generated simultaneously at a high level of efficiency. We provide cogeneration studies at various levels of detail, ranging from two-day preliminary screening studies to complete specifications suitable for turnkey proposals from suppliers and contractors.

Review, Design and Update of Utility Customer Service Programs

The utility business is restructuring. Many utilities are realizing that enhancing their customer service activities will lead to sustained profitability in a much more competitive environment. With our many years of experience in Customer Service and energy management services, we can assist a utility to adapt efficiency programs, and increase their effectiveness as a customer service tool.

Technology and Energy Use Equipment Reviews

We keep up-to-date on many technologies/equipment and can assist large energy users in determining how these developments will affect their costs. We have also worked with testing and R&D facilities to verify equipment performance and efficiency levels. We are up-to-date on an extensive range of technologies and equipment, including:

- distribution control systems
- burners
- electric motors
- transformers
- bio systems for effluent treatment
- low NOx burners
- conveyors
- control equipment
- process heating
- boilers
- dry kilns
- adjustable speed drives
- pumps
- compressors
- pneumatic transfer systems
- lighting
- chillers
- refrigeration

Seminars and Training Workshops

Education plays an important role in keeping key personnel up-to-date on the latest opportunities for efficiency improvements. We provide training workshops and seminars for customers on a variety of topics including design and efficiency developments for equipment and processes with cost and commercial availability; market trends and issues; and electricity and gas pricing.

Willis can assemble a Project Team of specialists providing the appropriate expertise to implement any of the services described. The expertise and experience of the following team members will be supplemented with specialist consultants depending on the project tasks involved.

Paul Willis has more than 30 years experience in the energy field. This experience encompasses energy management, marketing, research and development, project management, detailed and conceptual design, and commissioning and acceptance. He has participated in the implementation of a number of thermal power projects from detailed design work to arranging power sale contracts. He has designed and assisted in the implementation of a number of Industrial Demand Side Management programs. He is President of Willis Energy Services Ltd., an engineering consulting firm that works with large energy users to improve efficiency, with utilities and government agencies to promote conservation and with Independent Power Producers to implement power projects. His technical expertise is in the areas of heat transfer, combustion, industrial process systems, and the optimization of large power and heating systems.

Penny Cochrane works with clients to assist them in their energy and resource management decisions. From her background of over twenty years with a large integrated electric utility and six years as an independent energy management consultant, Penny's assignment areas have spanned from strategic planning, project development, ratemaking, regulatory affairs, environmental assessment and business operations to utility consumer program design, implementation and management.

Anthea Jubb is Willis Energy Services' Project Manager and is responsible for coordinating energy management initiatives. She also contributes to technical review and evaluation of potential energy efficiency measures. Anthea has recognized communication skills, and has written numerous technical reports. She also has experience developing and implementing continuous improvement strategies, and developing and applying mathematical models. Anthea has a Bachelor of Applied Science from University of British Columbia, is a Certified Energy Manager and Certified Measurement and Verification Professional. She is also registered as an Engineer in Training with the Association of Professional Engineers and Geoscientists of BC, and the State of Washington.

Stephen F. Hall, M.A., has over 26 years experience in the field of sustainable energy policy, planning and programming. His areas of expertise include energy efficiency program design, implementation and evaluation, integrated resource procurement and environmental economics. Mr. Hall possesses extensive experiences in sustainable urban transport, industrial energy efficiency and climate change policy. Currently a Willis Energy Services Ltd. Associate, his past clients have included the California Energy Commission, Valley Energy Efficiency Corporation of Davis, California, BC Hydro, Pembina Institute, the David Suzuki Foundation and the cities of Toronto and Vancouver.

Dominique Ramirez assists clients in their energy and resource management decisions. From her background of environmental impact assessment and as a consultant, Dominique's assignment areas have included demand side management, regulatory affairs and environmental assessments. She is fluent in English, French and Spanish; and has experience as a team player and maintains very high expectations for herself to produce quality results, ultimately furthering the success of the team. Dominique has helped organize the recently formed Commercial Energy Consumers group; a group that has been formed to analyze electric and natural gas rate alternatives. She has recently been involved in a review of Aquila's DSM program and helped organize customer feedback to this program. She has also recently worked with a commercial group on V.I. to analyze different Terasen rate alternatives.

John Tong is Willis Energy Services' Information Technology Specialist, and has more than 10 years experience in energy price tracking and forecasting, project data analysis, utilities tariffs analysis, site specific energy cost analysis, energy model development, and computer management. He also has extensive experience developing custom software applications, as well as applying retail applications such as MS-Windows, MS-Office, MS-Project, Autodesk QuickCAD, Adobe Photoshop, and Adobe Pagemaker. John is proficient in hardware platforms, such as SUN Station, Next Station, and IBM mainframe. John is fluent in English and Cantonese, and has a Computer Systems Technology Diploma from British Columbia Institute of Technology.

Mehran Rasouli is an Electrical Engineer with experience in power distribution, control systems, and electronics, as well in preparing feasibility studies for system improvement projects and tender packages. Mehran's areas of focus are measurement and verification, investigation and implementation of new energy efficient technologies. Mehran is fluent in English and Farsi, has a Bachelor of Engineering from University of Victoria, and is a registered Engineer in Training.

Amy Wong has over 9 years of administrative experience. She is responsible for a variety of administration and clerical duties such as schedule meetings and appointments, organize and maintain paper and electronic files, manage projects, conduct research, and provide information via the telephone, postal mail, and e-mail. She also prepares correspondence and handles travel arrangements.

Specific Project References

Cogeneration

We have investigated a large number of cogeneration projects for a variety of sites including; hospitals, universities, hotels, food processing plants, wood product, pulp mills and natural gas treatment facilities. These investigations involve examining closely the projected heat and electrical demand at the site over the projected life of a cogeneration facility, performing a cost estimate of the cost of a cogeneration plant and estimating the value of the electricity and heat which would be produced.

Industrial Conservation Potential Review

In conjunction with Marbek Resources **Willis** performed a conservation potential review of the B.C. Industrial Sector for B.C. Hydro. This Review involved estimating the conservation potential for each of the major industrial sub-sectors, including Pulp and Paper, Wood Products, Mining, Chemical Products, and Refining as well as the large variety of smaller sub-sectors.

Willis also worked with Marbek Resources in the performance of a conservation potential review for Terasen Gas. This review involved estimating the conservation potential for the small to medium industrial gas market.

Arranging Utility Contracts for IPPs

Willis has recently assisted Montenay Inc. and Riverside Forest Products to successfully complete 10-year contract arrangements for power with BC Hydro. Riverside's project was a 20 MW wood waste cogeneration facility, while Montenay's project was municipal solid waste facility at the Greater Vancouver Regional District's incinerator.

Energy Manager for Major Industrial Company

Willis has been the Energy Manager for Tolko Industries Ltd. a large wood products company in Western Canada since 2004 To date, Tolko has implemented over 15 gigawatt-hours (GWh) of saving projects and another 15 GWh are being installed, valued at $1,200,000 annually. **Willis** has also worked with extensively with Tolko and a predecessor company in obtain and administrating an Electricity Purchase Agreement for a 15 MW cogeneration project.

Evaluation of IPP Proposals

Over a period of eight years Paul Willis became familiar with a large number of IPP projects by assisting BC Hydro in the evaluation of a number of projects and in the negotiation of Electricity Purchase Agreement for gas-fired and wood-waste projects.

BC Hydro Industrial Power Smart Program

Willis continues to work extensively with BC Hydro in the development and administration of industrial Power Smart programs. This work involves continually analyzing energy saving targets, reviewing energy saving opportunities, helping to design initiatives and preparing cost and energy saving estimates for the overall industrial Program and for specific initiatives.

British Columbia Hydro's Process Improvements Program

This program was excellent example of a program designed to promote and support innovation in the pursuit of energy efficiency for large industrial customers. It has proven that sophisticated retrofits in the industrial sector can be implemented at a cost that is advantageous to utilities and their customers.

The program handled over 500 projects and implemented projects with total annual electricity saving of 75,000,000 kWh at a total resource cost of 1.20 cents/kwh.

Portland General Electric (PGE)'s Industrial Process Improvements Program

This program was designed to make industrial process improvement projects attractive investments for customers and PGE. PGE helps customers by: identifying leading industry experts, co-funding engineering studies and plant wide energy audits, providing technical research findings, and by offering financial assistance. **Willis** designed this program and is responsible for its operational management.

Energy Auditing for Commercial and Industrial Customers

Willis worked with two large US utilities on the design and implementation of energy auditing programs for large commercial and industrial customers. These auditing programs involve energy management personnel analyzing resource use, identifying opportunities, determining priorities and assessing potential savings and making recommendations. As well as commercial/industrial customers, one program is also assessing electro-technologies.

Industrial Energy End-Use Analysis Project

This project involved generating national (Canadian) energy end-use frameworks for the most energy intensive industries. The Canadian Industry Program sponsored the project for Energy Conservation, which has the goal of improving industrial competitiveness and reducing CO2 emissions through increased energy efficiency. Willis completed this project with a resource management group at Simon Fraser University. ISTUM (Intra-Sectoral Technology Use Model), an energy end-use model, was used to forecast energy use and conservation potential by industrial sector under different economic scenarios.

Guide for Small Scale Cogeneration

This guide was developed by **Willis** for Power Smart Inc. and is for use by utilities, government agencies, and industrial/commercial customers. It describes various cogeneration plants, the economics of cogeneration, interconnection considerations, and utility/cogenerator contractual arrangements.

Greenhouse Gas Emission Credits and Green Power

Willis worked closely with a pulp mill to obtain recognition as a valid Greenhouse Gas reduction project through the Greenhouse Emission Reduction Trading Project (GERT). **Willis** also prepared the Application to BC Hydro for the Riverside Cogeneration Project to be recognized as a Green Power project.

Water Conservation Program

In conjunction with Prism Engineering **Willis** implemented a water conservation program for the School District of North Vancouver.