




More than 20 years working on the development  
and evolution of public services



We believe that the expansion and access to public services contribute to the construction of a better future. We want to be an active part of their development and we are convinced of the benefits of universal access to services. This is why we work with passion to achieve it.

**Quantum** is an international consulting firm specialized in the area of Public Services, with a strong presence in the Latin American market and expanding to the rest of the world. In the modern world, public services are considered indispensable for human development. The best known are electricity, drinking water and sanitation, and natural gas. However, other services are now also considered basic needs, such as transportation and communications. Public services influence people's well-being. Access to quality and affordable services is key to fighting poverty and improving life quality. Public services facilitate people's education and development. At **Quantum** we know the importance of public services in people's lives. Having a reliable and accessible service is essential to modern life.

# Our Values

- **Ethics**, in any field of action
- **Client-oriented** attitude
- Commitment to **confidentiality, quality** and the improvement of our services
- Commitment with **Research and Development**
- **Responsibility** regarding the common good and the social contribution of our activities
- Zeal for the **dignity, prestige** and **professional** capacity of each of the members of our company
- Creating **Value for Society**, our Clients, our Company and Ourselves

“To be a **global company of excellence** in highly specialized multidisciplinary professional services”.

MISSION

VISION

“To generate **solutions of value** for Companies and Institutions linked to Public Services, in a global scope”.

# SERVICES

**Quantum** is a knowledge-based professional services company with a global presence and a solid reputation for developing effective, state-of-the-art business solutions. Since 1986, our team, made up of **Engineers, Economists, Lawyers, Accountants and Administrators**, has been investigating the optimal forms of regulation; actively intervening in the structural conception and design of incentive regulation mechanisms and creating models and methodologies to respond to the needs of their clients, from small companies to large institutions, as well as regulatory and control bodies.



# ECONOMIC AND FINANCIAL ANALYSIS

Businesses related to **electricity, natural gas, water, sanitation and transportation** are generally characterized by being capital-intensive natural monopolies, possessing exclusivity over a certain geographic region and being regulated by specialized agencies. This combination of attributes generates the need to study multiple aspects of the companies' activities in order to achieve the optimum use of the resources employed. The sunken investments made available to users must be recovered throughout their useful life while generating reasonable profits compared to activities of similar risk. Likewise, the costs generated by the efficient provision of services must be recovered in the tariffs. The profound debate around the business of public services produces sensitive effects on companies by modifying their income, the value of their assets and the penetration of the service in the community.



**Quantum** has developed a deep knowledge of the variables and effects that affect the market in order to support their clients in the following services:

- Tariff and Fee Structure
- Regulatory and Tariff Services
- Economic and Financial Analysis and Price Projection
- Market Analysis and Demand Projection
- Technical-Economic Feasibility Studies
- Risk and Threat Assessment
- Regulated Rate of Return Studies
- Support in Mergers and Acquisitions
- Due Diligence for companies in different sectors

# PUBLIC UTILITIES REGULATION



One of the central problems of economic policy is the **regulation of public utilities**, which present characteristics of natural monopolies, thus ensuring the provision of services at minimum cost, allowing them to obtain a return compatible with the business risk. The objective pursued by **Quantum** is to assist both the regulated company and the regulator in the application of objective, coherent and rational rules that encourage efficiency, minimize regulatory risk

and increase legal security. **Quantum** has extensive and outstanding experience in various Latin American regulatory scenarios.

The main services provided are listed below

- Regulatory Strategies
- Design and Reforms of Regulatory Frameworks
- Income Requirements Analysis
- Historical (Backward Looking)
- Projected (Forward Looking)

- Development of Tariff Policies
- Cost of Capital Calculation Methodologies
- Operating Cost Calculation Methodologies
- Tariff Design
- Tariff and Fee Structure
- Regulatory Accounting
- Litigation Support and Testimonials
- Demand Side Management Techniques

# RENEWABLE ENERGIES

Care for the **environment** and the **effects of climate change** have aroused great interest in the development of renewable energy projects. Today, these interests have been further enhanced for one main reason: economic, which allows projects such as solar photovoltaics to achieve higher returns than other traditional non-renewable energy projects.



At **Quantum**, we advise clients interested in evaluating the technical and economic feasibility of installing renewable energy projects that allow them to use the energy generated for self-consumption, sale to third parties and/or participate in renewable energy tenders. We provide support in all stages of the project, from the identification of the most profitable locations to the selection of the necessary suppliers for the execution of the work, being the main services:

- Analysis of all legislation linked to the project;
- Survey of resource potential and other climate characteristics that affect project performance;
- Survey of the electrical system;
- Analysis of existing technology alternatives;
- Survey of investment and operation and maintenance costs of available technologies;
- Valuation of tax benefits, income generated by the sale of carbon credits;
- Definition of the most profitable location for the project;
- Definition of the efficient scale of the project;
- Calculation of the rate of return of the project as a whole, as well as, of the shareholders. Calculation of the net present value and return period of investment.

# ECONOMETRICS AND STATISTICS

Economic theory makes qualitative statements and econometrics has the function of providing empirical content to economic theory. Research in the areas of planning, economics, finance, and other disciplines increasingly use quantitative methods. Econometrics is defined as the science that applies tools of economic theory, mathematics, and statistical inference to the analysis of economic phenomena.

This discipline applies statistical mathematics to economic data to validate economic models. Both public utilities and the agencies responsible for their regulation and control must often make decisions based on econometric studies. **Quantum** supports companies and regulatory bodies in studies that involve the application of analysis and the proposal of econometric models.

Among the main studies stand out:

- Global and Spatial Projection of Electricity, Gas, Water, Sanitation and Transportation Demands
- Projection of Macroeconomic Variables
- Consumption Curve Characterization Campaign
- Best Practices and Service Standards
- Identification of the Demand Structure according to the End Use of the resource





## BENCHMARKING

Regulatory strategies must be oriented to encourage the performance improvement of public service providers. **Benchmarking** allows to define the level of efficiency of the companies, providing useful information to their employees, investors, users and regulators. In order to evaluate performance and establish objectives for productivity improvements, a comparison with other companies with similar characteristics is generally carried out. **Benchmarking** is a tool that allows the definition and calculation of performance, cost and financial indicators to evaluate the relative efficiency of the company. **Quantum**, based on the experience acquired in diverse companies in Latin America, offers public service providers and regulators the **Benchmarking** analysis based on econometric studies to determine efficient Operating Costs.

# REGULATORY AND MANAGEMENT ACCOUNTING

- Implementation of Regulatory Accounting
- Determination of costs by activity (ABC Costing)
- Process analysis (ABM, Activity Based Management) "doing things right". Definition and improvement of the activities that add more value to the company
- ABB, Activity Based Budgeting
- Implementation of the Control Panel (Balanced Scorecard) that allows to monitor in real time the efficiency of the company and compare it according to the objectives set
- Benchmarking not only at company cost level, but also at the level of key processes of the different companies



**Regulatory Accounting** is the mechanism by which Regulatory Bodies can know the cost structure of their providers, measure their relative efficiency both at the company and activity levels, reducing information asymmetries and thus be able to determine a fair and equitable tariff to be paid by users. It helps companies to improve their cost management.

**Regulatory Accounting** is usually oriented towards a system of Activities Based Costing (ABC Costing) which, unlike traditional accounting, allows the allocation of costs taking into account the activities or processes that originated them.

The Activity-Based Costing system leads to improved cost management by relying on more rigorous allocations. Based on these concepts, both regulators and companies enjoy the benefits of knowing the true cost of the activities they perform, guiding the provider towards the path of efficiency and continuous improvement (Management Accounting).

Quantum has  
related to:



## LEGAL ANALYSIS

Public Services include relations of three legal entities: the companies that provide them, the State, generally represented by the Regulatory and Control Bodies, and the Users. This group of people and entities constantly creates legal relationships. These relationships are regulated by different rights: the Administrative, the Civil, the Commercial and the Criminal. **Quantum** has accompanied some of these legal entities, especially public service providers and Regulatory Entities, in various legal aspects, mainly in tariff matters, providing legal assistance in defense or modification of tariffs.

**Quantum** assists their clients in the following areas:

- Support in Litigation and Testimonials
- Design in Regulatory Framework Reforms
- Design of Supply Contracts
- Conclusion, Execution and Approval of Contracts
- Elaboration of Tender Documents
- Administrative Procedures and Appeals

# STRATEGIC SERVICES



The ability to work effectively on a global scale, along with a solid reputation for providing business solutions, allows **Quantum** to assist its clients anywhere, offering strategic consulting services ranging from scenario and trend assessment to strategic thinking and implementation.

**Quantum** offers a wide range of technical, business and strategic consulting services, among which the following stand out

- Regulatory Services and Analysis
- Strategic Planning
- Assistance in Privatizations
- Business Management Consulting
- Competitiveness Analysis
- System Security and Reliability Studies
- Internal Audits
- Contract Administration
- Review and optimization of processes
- Budget Program Development
- Review of the Operation and Maintenance Budget and Investments
- Asset Valuation
- Supply Strategies

# SIMULATION MODELS

**Quantum** has developed a simulation model for Electricity and Gas Markets, called OMEGA. This model is currently used by important power generation companies in Argentina. It was also used to assist in arbitrations and to simulate other wholesale markets, such as SIEPAC, Peru, Bolivia, Cameroon, etc.

The applications of this model include:

- Simulation and integration of Wholesale Electricity and Natural Gas Markets
- Planning and Optimization of Power Plant Dispatching
- Support operators in the purchase and sale of energy and natural gas, in Spot Markets and Term Contracts
- Evaluation of Generation Projects
- Decision for optimal installation of new plants (thermal, hydraulic, wind, solar, etc.)
- Mechanisms for optimal expansion of new gas pipelines and electrical transmission lines.



Simulation is the study of a process by observing the behavior of a model, over time, in response to a pattern of inputs. The development of Mathematical Simulation Models is a modern analytical technique that can be used in the different stages of the evaluation of different strategies.

**Quantum** uses modern modeling systems, with linear, integer linear and mixed linear programming algorithms. It has also developed numerous models with dynamic programming.

# BUSINESS MANAGEMENT FOR UTILITIES

We work together with the organization, providing the companies with the necessary tools for their evolution and growth, thus facilitating the expansion of their potential in the most efficient way. We propose a transformation in the organization that encompasses organizational, financial, management, and decision-making practices.

We are committed to the execution of our clients' changes by favoring the natural development of their organizations' competences and skills to build self-managed companies not dependent on permanent consultancies.

## What we do

We specialize in achieving for our clients an improvement in results, verifiable in:

- Cost reduction
- Improved collection times
- Greater control of operations
- Certainty in the uniform execution of processes



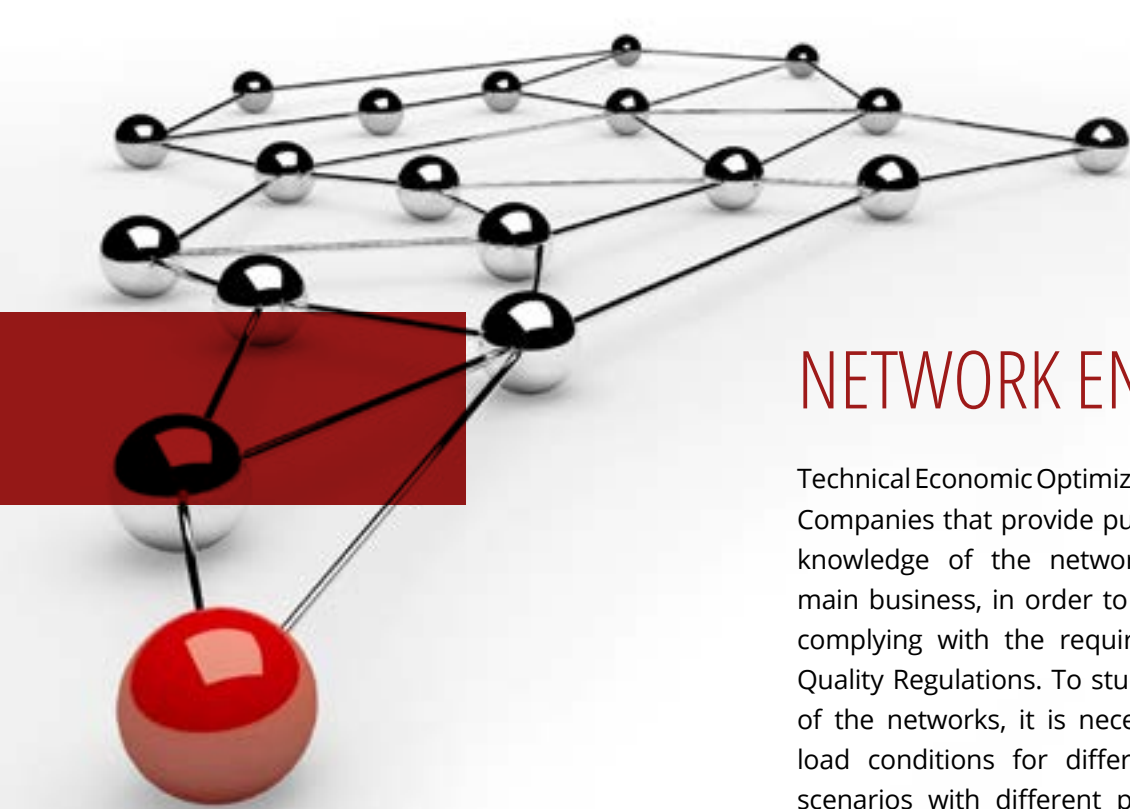
# AUCTIONS

Given the nature of the electricity distribution business, characterized as a natural monopoly, auctions are the optimal and most transparent mechanism for the purchase of energy and power. In the specific case of electrical energy, multi-product reverse auctions are held. This refers to a mechanism in which generators make bids, with those that minimize the total cost of purchase being selected. Determining the optimal set of offers is a great challenge, since many factors influence it, such as:

- Generation Technology
- Incentives
- Type of contract selected, depending on the product to be sold (energy and/or power)
- Demand profile to be supplied
- Expected spot prices

**Quantum** has developed an energy and power purchase optimization model, called OPTIME, which uses mixed programming to solve the problem. The objective function (total cost) to be minimized in a real energy and power auction has hundreds of thousands of variables, so the system has been developed using world leading software. OPTIME is developed in a web environment, allowing each user to test and analyze sensitivities.





## NETWORK ENGINEERING

Technical Economic Optimization of Existing Networks. Companies that provide public services need a deep knowledge of the networks that constitute their main business, in order to manage them efficiently, complying with the requirements imposed by the Quality Regulations. To study the optimal expansion of the networks, it is necessary to simulate typical load conditions for different situations, analyzing scenarios with different probability of occurrence. During the simulations the bottlenecks are identified and the profitability of removing them is evaluated. For this purpose, it is necessary to calculate the expected value of losses and the cost of failures involved with each investment decision. The main tools used are demand flow calculation programs, through which the operating characteristics of the systems are determined for a certain set of specific loads. **Quantum** uses software specifically developed

for this purpose, which allows these studies to be carried out with great precision, providing a reliable solution and versatility. It also has links with the programs frequently used by companies for network management (Neplan, Milsoft, PSS, etc.), database administration (Access), spreadsheets (Excel), and graphic processing systems (AutoCAD). **Quantum** has developed numerous engineering studies, among which the following stand out:

- Investment Plans
- Loss Studies
- Network Planning
- Network Due Diligence
- Technical-Economic Feasibility
- Conclusion, Execution and Approval of Contracts
- Elaboration of Tender Documents
- Administrative Procedures and Appeals




# IN-COMPANY TRAINING

**Quantum** understands continuous improvement as a necessity for job growth, to maintain the high level demanded by clients on a daily basis and to help organizations achieve greater competitiveness. That is why Quantum offers training courses on regulatory matters under the modality “In company”, aimed at company executives and institutions that require them, in their own offices and with the subject matter requested by the company, or through open seminars which subject matter and duration are published in a timely manner. The training includes the following topics:

- Microeconomic Foundations of Regulation: Demand, Supply, Market, Surplus, Optimal, Competition and Monopoly, The Marginalist Approach to Pricing
- Regulatory Strategies: Service Cost Regulation, Incentive Regulation, Price Cap, Hybrid Approaches
- Tariff Methodology: Cost Function, Welfare Maximization, Optimal Tariffs for Capacity Use, TOU Tariffs, Sustainability, Ramsey Tariffs, Average Cost Allocation for Responsibility in Use, Demand

Projections, Load Characterization Study

- Cost of Capital: Capital Base, Cost of Capital, Cost of Capital Rate, Donated Capital, New Replacement Value
- Operating Costs and Non-Technical Losses: Cost Efficiency, Cost Indicators, Benchmarking, Non-Technical Loss Optimization, Cost Projection
- Optimal Tariff Structures: Cost Allocation, Annual and Seasonal Tariffs, Responsibility Factors, DAV Decomposition, Cost Curve, Optimal Tariff Blocks



In today's world, continuous training and education are an invaluable asset, and represent an indispensable requirement for the growth of a company and institution.

- Market Simulation: simulation of the behavior of agents within the electrical industry. Dispatches according to order of merit to cover the demand. Dispatch at minimum cost
- Market Risk in Price-Cap: Tariff Variation, Exogenous Variables, Efficiency Factor
- Network Optimization and Technical Loss Study: Green Field and Top-Down Models.

# SEMINARS

Since its beginning, **Quantum** has shared its knowledge and know-how in the field of **Public Services Regulation and Tariff Calculation** with their clients and with the community in general, developing a variety of training activities: from In Company Courses and the participation of experts in Forums and Conferences, to the organization of International Seminars.



Specialized members of our team manage every aspect of these activities, from the research and design of the contents, to the handling of the logistics of the event in situ, ensuring the highest standards of quality and incorporating, at every opportunity, the latest state-of-the-art developments and knowledge. Without counting the attendees of In Company Courses, more than two hundred people have attended our International Seminars, belonging to 98 institutions, including Regulatory Bodies and Utilities from 21 countries.

# Work done in:

- Argentina
- Bolivia
- Brazil
- Cameroon
- Chile
- Colombia
- Costa Rica

- Ecuador
- El Salvador
- Spain
- Guatemala
- Honduras
- India
- England

- Solomon Islands
- Jamaica
- Mexico
- Mozambique
- Nicaragua
- Panama
- Paraguay

- Peru
- Dominican Rep.
- Uruguay
- USA
- Venezuela



# Offices:

- Argentina
- Brazil
- Panama
- Peru
- USA

[www.quantumamerica.com](http://www.quantumamerica.com)