



ECCO International Incorporated Corporate Profile

ECCO International Profile

ECCO International, Inc. is a specialized Energy Consulting and Software Company that provides consulting and software services within and outside the U.S. to a wide range of clients such as Regulators, Governments, Utilities, Developers, Generation Owners, Municipalities, Independent System Operators, Power Exchanges, Marketers, Brokers and Software vendors. These services range from EMS/AGC operations, strategic planning, particularly industry restructuring and the introduction of competition into traditional utility markets, competitive bidding, asset evaluation, power plant and infrastructure development, power system planning, market trading, direct access planning, public policy analysis, auditing utility practices, simulation and optimization, power systems design, energy market design, renewable energy resources modeling and analysis, settlements design and analysis, pricing negotiation and strategy, and related topics concerning industrial organization and information economics.

ECCO International also provides consulting, engineering and software services in the area of power systems operations, impact of renewables on operations and energy markets, power generation, transmission planning, transmission and power contracts, system dynamics, real time control and implementation of EMS advanced applications and forecasting in a utility environment. As part of these services, ECCO International is heavily involved in the development and implementation of advanced methodologies and models, software and systems to support the new energy market structures and large databases and information systems to support Energy Management Systems, system operations, grid and merchant operations, energy audits, transmission planning, transmission and power contracts and power generation business units.

Finally, ECCO International has developed and implemented advanced energy market simulation software tools to assist our clients participate in competitive energy markets, develop optimal bidding strategies, predict congestion, schedule their resources, perform generation and transmission upgrades, develop investment strategies, perform reliability studies, and develop CRR/FTR optimal strategies for hedging their risks.

Dr. Alex Papalexopoulos is president and founder of ECCO International and has global electric power system knowledge and invaluable regional and practical experience. Dr. Papalexopoulos remains abreast of the latest developments in the electric power industry and participates in numerous forums with leading organizations that are critical in creating market design decisions and developing technology solutions. He is dedicated to providing the highest-quality consulting services, and his reputation serves as the cornerstone from which ECCO International is actively expanding its scope and expert resources.

ECCO International currently maintains a cache of about 35 recognized industry leaders, highly educated professionals, mostly with Ph.D. degrees and former industry participants capable of assessing, designing, developing, testing, and implementing energy market and business solutions in response to the rapidly changing energy environment. ECCO International's associated professionals are well versed in conducting, articulating, and presenting insightful original

studies on behalf of our clients and offer an interdisciplinary approach to each assignment that takes projects from the analysis stage to implementation. Associated consultants conduct most assignments on-site at the client's location — bringing continuity and focus that helps meet each client's specific needs in a timely and effective manner.

Consulting Services

Generation Evaluation and Infrastructure Development

ECCO International has the capabilities to review power plant development and asset acquisition in challenging electricity markets. The capabilities include market structure/pricing review, power plant configuration evaluation, project siting, project management, definition of optimal fuel usage and determining the most feasible power plant point of interconnection. Our experts in this field are well recognized in the industry and have worked in the US and international power markets. Our expertise extends to experience in project development management, project economic and financial reviews, project financing strategies and defining utility interface. Our knowledge covers fossil power plants and renewable energy (such as wind, bio-energy, gas, etc.) and new technologies such as the gasification and fuel cells applications. Our experience also includes engagement in power plant asset acquisition evaluation as part of the engineering and financial teams.

Furthermore, our experts have extensive experience in generation and transmission feasibility studies, Environmental Impact Assessment, risk analysis, project implementation plan development, tender preparation, contractor selection, contract negotiation and administration, work supervision as well as electricity trading. Our recent assignments have included management of due diligence process for major acquisitions, project concept development and competitive procurement processes for a wide range of infrastructure projects such as transmission and power projects, dams, bridges and gas supply projects.

Energy Management System Operations & Procurement

ECCO International has extensive experience and expertise in developing and implementing Energy Management Systems (EMSs) and specifically advanced applications for EMSs. This includes the definition of the client's needs and functional and design specifications, development, implementation, factory acceptance testing, field testing, installation, training, customization, maintenance, migration strategies, RFP development, vendor selection and negotiations, support and consulting for power, network, forecasting, scheduling and training EMS/AGC applications. These applications include AGC, Economic Dispatch, Load Frequency Control, Dispatcher Power Flow, Security Analysis, Optimal Power Flow, Security Constrained Unit Commitment, Transmission Constrained Economic Dispatch, Load Forecasting, etc. This also includes the development of power system analytical methods and software in a number of other areas, including optimization, grid modeling, dynamic and voltage stability, transmission and operations planning, generation expansion, internet/intranet applications for the QFs, bidding systems for resource acquisitions, and costing methodologies for transmission services. ECCO International has made substantial contributions in the areas of AGC, grid optimization, State estimation, Optimal Power Flow, Unit Commitment, Scheduling, Hydro Modeling, and Forecasting applications.

Industry Restructuring

ECCO International has served in key advisory roles in the formation of new energy markets since the inception of deregulation and restructuring or privatization of the electric power industry both in the US and abroad. We are

committed to helping our clients understand market complexities and how to develop a successful position in the market.

For emerging as well as maturing at a rapid pace markets, ECCO International can help to assess the impact of new or alternative market structures, understand proven approaches and those thwarted by regulators and evaluate options for moving forward. Our services focus on the following areas:

- Optimal Market Structures and Impact Assessment
- System Operator Structural Planning
- Independent or Integrated Power Exchanges
- Regulatory Aspects (Wholesale and Retail)
- Governance (Federal, State and Local)
- Stakeholder Participation

Transmission Business Models

Different models present alternatives for the mix of responsibilities for the transmission regulatory framework in support of new decentralized electric industry structures. Various organizational and ownership structures related to transmission leads to a different set of problems and incentives. No matter which market design is chosen for implementation, there must be a close connection between the design of options for market flexibility and the pricing principles for actual use of the transmission grid. The key ingredient deals with management of transmission congestion and investment incentives. We believe that an efficient spot market and the associated prices and a workable system of transmission rights are necessary to stimulate investment in transmission by market participants. ECCO International can assist your organization in understanding the various market design options and which approach will bring you the most value.

Regional Transmission Organizations (RTOs)

The Federal Energy Regulatory Commission's Standard Market Design (SMD) proposal and other efforts by similar organizations such as the European Parliament have provided guidelines on market design principles, ownership, governance structure, regional boundaries, independence of market participants, and incentive regulation, but the success remains in the specifics that can only fashion well-designed market institutions. The rules for access to essential facilities, pricing schemes and consistent and efficient incentives that foster a more robust transmission network and enhanced operating capabilities are integral details of important market structure decisions. ECCO International can help with your efforts to be consistent with FERC's market design principles and standards or with EU guidelines where appropriate, while achieving value for your specific organization. Our industry experts have the regional contacts and practical experience that will make it easier for you manage inter-regional activities and seams issues.

Independent System Operators (ISOs) & Transmission System Operators (TSOs)

The ISO/TSO provides a dispatch function that coordinates the spot market. The ISOs in the US do not own transmission lines yet they schedule and dispatch generators on transmission networks to provide energy, ancillary services, manages congestion, and assures network reliability. In Europe on the other hand, many transmission operators own the transmission network and they offer an alternative market structure with its own benefits and challenges.

We have extensive experience in working with both type of organizations and can provide substantial value to our clients in designing and implementing such markets. For example, as an integral part of California's ISO start-up operation in 1998, ECCO International consultants participated in the early market structure issues including the design of market

operations and use of independent power exchanges. After the California energy crisis, ECCO was the key consultant to the California ISO in designing, developing and implementing the new LMP-based energy market in California. Our team understands the details of what works, what does not, and the lessons learned from this unique experience. Our consultants have played a critical role in reassessing California's market design and were instrumental for the success of the new LMP-based market in California.

We can also assist with system and market operator structural planning and how to interface with the various market participants, independent power exchanges, and regulatory and governing agencies.

We have provided similar services to other ISOs/TSOs in the U.S. and abroad, including, ERCOT in Texas, ISO-NE, IESO in Canada, PSE in Poland and the HTSO in Greece.

The following are specific areas ECCO International can provide unique value to your organization:

- Organizational Structure
- Business Processes
- Market Design and Implementation
- Detailed Design Specification
- Software Vendor Selection
- Operating Procedures
- Stakeholder Processes
- Tariff development

Transco

A Transco is a single regional entity that owns and operates the transmission system, but is independent of generation and load. The Transco model emphasizes the combined responsibility for ownership of the wires and conduct of system operations. Similar to the other business models, ECCO International can assist you in evaluating the best option for your organization and develop and execute a market plan consistent with your business and corporate objectives.

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- Software Vendor Selection
- Operating Procedures
- Stakeholder Processes
- Tariff development

Gridco

A Gridco is a regional entity that owns transmission wires and is independent of generation and load. The Gridco is not responsible for controlling use of the system, but must be paired with a system operator. Similar to the other business models, ECCO International can assist you in evaluating the best option for your organization and develop and execute a market plan consistent with your business and corporate objectives.

Power Exchange (PX)

Whether private or public, there is a role for power exchanges in the new energy marketplace. ECCO International provides consulting services on all aspects of market design and deployment of the infrastructures and systems needed to conduct and clear electricity as a commodity in the forward markets.

Retail/Open Access

Customer response to newly opened competitive markets plays an integral role in the success of a new market and the pace at which any new market evolves. ECCO International can help you to identify barriers and success factors that have been critical to newly opened markets. The key areas ECCO International can provide value to your organization are:

- Market Segmentation
- Aggregation
- Unbundling
- Demand Response Programs
- Evaluation of Retail Customer Switching, Acquisition Costs, Profitability
- Load Profiling
- Metering, Billing, and Settlements.

Competitive Generation Bidding and Market Simulation

ECCO International's experience doesn't stop with theoretical market design; we are also experts in how to competitively participate in the new markets. From power contracts, risk management to energy trading, we know how to help you get the most out of your transactions. ECCO International has developed market simulation software using advanced mathematical techniques to assist our clients determine optimal bid levels and bid prices, schedule hydro and thermal generation, maximize profits, perform revenue analysis, predict market prices and transmission congestion, and evaluate generation and transmission projects.

Energy Market Design & Analysis

While the US standard market design for electricity markets continues to advance and other world-wide designs mature, ECCO International offers customized market design services, market research and market intelligent services to clients who wish to stay ahead of the fast evolving energy marketplace. Participating with a complete spectrum of participants in energy markets regionally and worldwide, ECCO International can help you evaluate if a particular market design feature or strategy would benefit your organization.

ECCO International's practical experience provides innovative solutions tailored to meet our clients' diverse needs. We provide turn-key consulting from guidance on the type of assessment that would bring valuable insights for decision making, to designing wholesale electricity markets, to conducting independent studies to simulate various market elements.

Examples of subject areas of ECCO International's expertise on market design and analysis include:

- Congestion Management
- Network Model Development
- Locational Marginal Pricing (LMP) development and implementation
- Locational Marginal Pricing (LMP) Cost Benefits Analysis

- Zonal vs. Nodal Price Delineation
- Market Separation
- Scheduling
- CRRs/FTRs as Obligations vs. Options
- Forward Energy Markets
- Existing Transmission Contracts
- Reliability Must Run Unit Scheduling
- Ancillary Services Definition, Procurement, Pricing and Settlements
- Sequential vs. Simultaneous Energy/Ancillary Services Procurement
- Real Time Markets
- Security Constrained Unit Commitment (SCUC)
- Security Constrained Economic Dispatch (SCED)
- Risk Analysis
- Global and Local Market Power Mitigation (MPM)
- Settlements Analysis
- Metering
- Settlements Charge Gap Analysis and Reconciliation
- Operational Procedures
- Grid Code Development
- Organizational Structures (e.g., Transco vs. RTO)
- Market Analysis and Simulation

Market Operations

ECCO International is on the forefront of the transition to competitive energy markets in the electric power industry in the US and other countries. We help our clients to design and implement the market rules and pricing approaches for new energy markets. As advisors to market participants and policy makers, we have extensive experience and expertise with all the elements of any market design through development, system implementation, analysis and modeling of:

Market Rules

- Forward (day-ahead, hour-ahead) markets
- Real-time (imbalance energy market)
- Market Power Mitigation
- Reliability Unit Commitment
- Market separation
- Scheduling and Unit Commitment
- Reliability Must Run Scheduling
- Schedule Coordination

Congestion Management and Pricing Systems

- Zonal
- Hub (hybrid)
- LMP Theoretical and Practical Considerations
- LMP Aggregations and Trading Hubs
- Full Network Modeling

Firm Transmission Rights (FTRs, CRRs or TCCs) and Allocation Rules

- Physical
- Financial
- Point-to-Point
- Flowgates
- Obligations
- Options
- Existing Transmission Contracts (ETCs)
- Allocation and various priority schemes

Ancillary Services

- Sequential with energy
- Simultaneous with energy
- Simultaneous with congestion management
- Requirements
- Procurement and Pricing
- Settlements

Capacity Markets

- Requirements
- Eligibility
- Procurement and Pricing
- Settlements
- Penalties

Settlements

- Design Rules
- Design Specifications
- Software Implementation
- Gap Analysis
- Settlements Reconciliation

Measures for Gaming and Market Power Mitigation

Expert Testimony & Litigation Support

ECCO offers electric power system expertise combined with leading-edge restructuring knowledge that assists clients with industry related litigation or regulatory proceedings.

Management Consulting

An increasing need exists for knowledgeable experts to address the challenges of new market structures and assist clients with changing market rules and regulations. Whether you are looking for advice on a specific direction or need

help evaluating your options (or what to even consider), ECCO International stands ready to provide strategic advice and help you cope with the challenges of the ever-changing competitive energy markets. We are dedicated to providing high quality and even confidential consulting, if necessary, that will meet your needs completely and effectively.

Energy Market System Software Implementation

ECCO International has unique capabilities in helping our clients develop functional and design specifications to implement software systems that support energy markets. Our extensive experience and expertise in building software systems in the power industry and developing market rules for competitive energy markets in various jurisdictions gives us a competitive advantage in helping our clients in the development of functional and design specifications, development, implementation, testing, factory acceptance testing, site acceptance testing, field testing, installation, market trials, training, customization, maintenance, migration strategies, and support of software systems that are needed in energy markets. These systems include software to interface the ISO with market participants, software required to clear forward and real-time markets, scheduling, pricing models, interface systems with other legacy applications in the organization, settlements, and billing software and other software needed for reporting applications and software required to make market data available to other financial applications such as SAP.

Business Analysis

ECCO International has expanded its capabilities to help our clients in the areas of Business Process Management and Business System Definition. In the area of Business Process Management we offer services in the areas of:

- Business Process Analysis and Modeling
- Work Flow and Data Flow Analysis
- Business Process Improvement
- Business Process Integration.

In the area of Business System Definition we offer services in the areas of:

- Establishing methods for defining business systems and determining needed improvements
- Enabling our clients to do a complete and in-depth risk assessment by utilizing UML design
- Using UML to create better controls to maintain and monitor compliance issues
- Gaining a better understanding of the business, its processes and the resources using UML methods
- Using UML to give every employee a common view and understanding of the business as a whole, and where they fit into that business.

Furthermore, ECCO International is offering our clients services in the area of determining business requirements on the technology/software side. This includes Business Requirement gathering, Use Case development, data requirement development, functional specifications, etc. Our services are focused to:

- Implement practical methods for understanding user requirements
- Develop and document functional requirements
- Explore proven tactics for managing project scope
- Apply use cases in the real organizational environment
- Develop test case and test procedures with use cases.

Project Management

For any project to succeed, our clients need insightful and comprehensive planning that addresses all aspects of implementation. ECCO International specializes in project management for the energy industry and specifically for Independent System Operators, Regional Transmission Organizations, Power Exchanges, Energy Companies and Utilities, and software solution providers. Our consultants are industry experts that deeply understand current energy issues and are already versed on complex energy concepts related to power markets, power systems, industry-specific terminology, analytical modeling, advanced methodologies related technologies and IT infrastructure and project management techniques. Our project managers have proven domain expertise and can assist you from the beginning to completion:

- Project Initiation - Define the project scope, objectives, schedule, required resources (including staff, technology and capital cost estimates), and introduce the project to various internal and external stakeholders.
- Project Planning - Outline the detailed approach and steps needed to meet the expected results of the project.
- Project Execution & Control - Manage the project scope and work, track work completion against the project schedule and costs against the project budget, and handle project issues and reporting of project status.
- Project Rollout - Prepare the project for ongoing support, evaluate its success and opportunities for improved practices, and archive project documentation.

In addition, our project managers are keen with contract negotiations, RFP creation, RFP vendor evaluation as well as soliciting and selecting qualified vendors to conduct the work.

Software Services

Furthermore, ECCO International has developed and implemented advanced energy market simulation software tools to assist our clients participate in competitive energy market, develop optimal bidding strategies, predict congestion, schedule their resources, perform generation and transmission upgrades, perform reliability studies, and develop CRR/FTR optimal strategies for hedging their risks. A brief description of these software packages that ECCO is currently marketing worldwide is as follows:

ProMax™

ECCO International, Inc., ("ECCO") has developed ProMax™, a short-term, integrated energy and transmission market simulation software package that allows the accurate simulation of the Day-Ahead Market Clearing process performed by Independent System Operators or Transmission System Operators. ProMax™ performs a Day-Ahead Market Clearing simulation and produces energy market outcomes, such as schedules, market clearing prices congested paths and cost of congestion, taking into account bids from the market participants, the load forecast, forecast plant outages and forecast transmission outages.

A key objective of the ProMax™ software is to simulate the energy market Clearing and Dispatch processes performed by Independent System Operator and Transmission System Operators and produce an optimal schedule which minimizes production costs while respecting all resource constraints, such as start up costs, minimum up/down times, operating constraints, unit initial conditions, transmission constraints and ancillary service constraints.

ProMax™ utilizes the same modeling features as the Day-Ahead Market Clearing engines commonly used in ISOs/TSOs, with a full simultaneous multistep Unit Commitment MIP model which iterates with a full AC power flow, utilizing Power Transfer Distribution Factors (PTDFs), (or Generation Shift Factors) to enforce transmission constraints. Losses are fully modeled in the optimization using loss factors derived from the solved AC power flow solution as it iterates with the MIP UC. After the commitment solution is complete, a pricing run is performed to provide the dual variables to use in the LMP calculation, which includes the calculation of the energy, loss and congestion component for each bus, location, Load Aggregation Point (LAP), Trading Hub and APNode.

The ProMax™ model has been recently upgraded to include advanced features currently debated at the CAISO such as demand bids, convergence (i.e., virtual) bids and scarcity pricing of ancillary services.

The key ProMax™ output information is the hourly schedules and Locational Marginal Prices (LMPs), or zonal prices, Ancillary Services Marginal Prices (ASMPs), binding constraint sets and corresponding shadow prices.

ProMax™ has been successfully used by various Market Participants for various purposes. Typical ProMax™ applications include:

- Day-Ahead Market price forecasting (LMP/MCP), etc.
- Market simulation and what “if scenario” studies
- Validation of ISO market outcomes
- Transmission flow and congestion forecasting and analysis
- Loss factor forecasting
- Reliability studies, EUE/LOLP calculations, etc.
- Generator bid strategy evaluation
- Renewable Energy Resource modeling and analysis

CSS™

ECCO International, Inc., (“ECCO”) is pleased to offer you CSS™, a comprehensive market simulation package to assist you in understanding the Independent System Operators’ CRR Allocation/Bidding process. The CSS™ software package is a CRR Allocation/Bidding Simulation tool which simulates the Financial Rights or Congestion Revenue Rights Allocation and Bidding process used by the ISOs. The CSS™ software has been configured to use the identical DC network model and enforce the same network constraints that have been published and used by the ISOs. ECCO has also incorporated into the CSS™ all the market rules of the California LMP-based market. Any extensions required to simulate other LMP-based energy markets are straightforward and easy to implement.

CSS™ accepts the proxy nominations from Market Participants and applies them to the ISO’s passive DC network. It then enforces the same Simultaneous Feasibility Test (SFT) the ISOs use to the set of proposed CRR Nominations. These nominations include the nominations being evaluated by the Market Participant combined with the proxy nominations of the other Market Participants in a specific energy market. ECCO has implemented a methodology using public data to calculate the proxy nominations of the other Market Participants.

CSS™ allows Market Participants understand the complexities of the ISO’s CRR Allocation/Bidding Process and provides accurate simulations of the Simultaneous Feasibility Test (SFT) for predicting the binding constraints in the network and the contributions of nominations and bids on the binding constraints. CSS™ can be used for a multitude of applications. The many features incorporated into the standard design of CSS™ makes it, we believe, the best value-for-money product available.

CSS™ is being successfully used by Market Participants in the California energy market.

Typical CSS™ applications include:

- Development of the detailed Network Model used for clearing CRR Nominations and Bids
- Congestion and Binding Constraint Forecasting
- Transmission Flow Forecasting
- Nomination/Bid to Transmission Binding Constraints Contribution Analysis
- PTP CRR vs. MP CRR Selection Analysis

- CRR Strategic Evaluation and Analysis
- CRR Revenue and profit Forecasting, and Investment Evaluation.

ProMaxLT™

ECCO International, Inc., ("ECCO") has developed and implemented a comprehensive long-term market simulation package, called ProMaxLT™, to assist ISOs/RTOs and Market Participants in understanding the complexities of the competitive electricity market and provide accurate simulations of market behavior for a multitude of applications. The many features incorporated into the standard design of ProMaxLT™ makes it, we believe, the best value-for-money product available.

ProMaxLT™ has been successfully used by various Market Participants as a market analysis and forecasting tool, especially for long term applications.

Typical ProMaxLT™ applications include:

- Reliability studies, LOLP calculations, etc.
- Market simulation studies, market price forecasting, etc.
- Congestion forecasting
- CRR (Congestion Revenue Rights) strategic evaluation and analysis
- Transmission flow forecasting
- Loss factor forecasting
- Generation plant revenue and profit forecasting, investment evaluation
- Generator bid strategy evaluation
- Integrated Plant Expansion plan, where multiple plant expansion options are considered, automatically selecting the best set of options via dynamic programming.

The major strength of ProMaxLT™ is the precision of the model which ensures consistency of results between studies and this precision has been proven over again in many market study audit situations, where the results of ProMaxLT™ have been independently checked. This precision and consistency is a result of ProMaxLT™ using a nodal configuration which optimizes network flows (and constraints) with dynamically calculated limits; Monte-Carlo based plant outage consideration; LP-based optimization; and discrete hourly modeling. The major blocks of ProMaxLT™ are shown below.

ProMaxLT™ may also be used to perform sensitivity studies of different plant expansion options, fuel price scenarios, load forecasts and transmission expansion options. These sensitivity studies may be used in investment risk analysis and evaluation.

Key Clients

ECCO International and its associates have provided extensive consulting services and expert advice to various clients worldwide. The following represents a partial list of ECCO International's regional activities:

California Independent System Operator (CAL ISO)

Provided extensive consulting services and expert advice on the energy market design and software development of various market operations functions since its inception of the CAL ISO in 1998. This includes the redesign of the EMS/AGC, State Estimator, Interfaces of State Estimator and AGC with Real-Time Markets, Ancillary Services markets, the Congestion Management market, Reliability Must Run (RMR) scheduling, Capacity and Generation Adequacy Markets, the Real Time and Forward Markets, RTO design, and various settlements and billing functions. It also includes various activities at the CAL ISO to ensure FERC compliance.

Since 2001, ECCO has been the lead consultant at the CAL ISO for the development and implementation for the new LMP-based energy market in California. ECCO International designed the Congestion Revenue Right Allocation and Auction (CRR) process, the Integrated Forward Market (IFM) including Day-Ahead and Hour-Ahead markets and the Real-Time Market (RTM) consisting of multi-interval Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) functions. ECCO International conducted numerous simulation studies, and developed load aggregation concepts, pricing rules, and settlement procedures and formulae for forward and real-time markets and cost allocation mechanisms. ECCO International produced the software requirement specifications and business rules for the Integrated Forward Market (IFM) for energy and ancillary services, the Residual Unit Commitment (RUC) for reliability purposes, the Real Time Market (RTM), and the Market Power Mitigation (MPM) procedures. In addition, ECCO International ensured the business rules were consistent with the proposed tariff on file with the Federal Energy Regulatory Commission.

From a project management and technical consulting perspective, ECCO International consultants were involved with the solicitation process (RFP development to vendor evaluation) and proof of concept activities involved in procuring the best software solution for the CAL ISO. In addition, ECCO International's team conducted the review of the design specifications from the software vendor to assure compliance with the requirements, wrote test cases and prepared test data, and successfully performed pre-Factory Acceptance Testing, Factory Acceptance Testing (FAT) and Site Acceptance Testing (SAT) of the market application's baseline functionality for the Forward and Real-Time Markets.

ECCO International staff members also provided guidance for software integration via service-oriented architecture and provided technical support for Common Information Model (CIM) market extensions.

New England ISO (ISO NE)

Provided expert advice and consulting services in analyzing various elements of the Forward and Real Time markets and scheduling algorithms including Lagrangian based and Mixed Integer Programming (MIP) based Units Commitment algorithms. It performed an extensive comparison of Mixed Integer Programming based Unit Commitment algorithms provided by various software vendors.

ERCOT (Electric Reliability Council of Texas, Inc.)

Participates in the design and implementation of the new LMP based market in Texas. Provides extensive support in developing the software systems for the State Estimation Function, forward and real-time markets, scheduling, congestion revenue rights markets and various settlements and billing functions. Developed all business processes associated with CRR allocations, CRR Auctions and Bilateral Ownership Transfers and provided extensive support in developing the ERCOT controlled network. Assists ERCOT in developing a comprehensive CIM-based data model including all necessary extensions into the standard CIM dictionary that forms the basis for the EMS and MMS proprietary databases and designed and implemented the Web Services program to support the market systems.

In 2004 participated in performing a cost benefits analysis of the LMP based energy market model that is currently under consideration in the wholesale energy market in Texas.

Independent Electricity System Operator (IESO)

Provides consulting and auditing services to IESO for Reliability Must Run (RMR) units. This includes the collection of scheduling and billing data, the review of the agreements related to voltage control and real power dispatching of the plants under pre-defined network system conditions, the identification of conditions that may have created unnecessary expenses that were included in the billing costs and the evaluation and analysis of any plant operations that were deemed beyond the agreement's pre-defined schedules that may have caused an adverse impact on the security and the reliability of the network. Finally, ECCO International has been involved for several years in performing an audit to determine the practices adopted by the plants to meet the good utility practices and standards in the areas of fuel consumption, scheduled maintenance, unit ramping, plant functionality, electrical services, plant's electrical auxiliary system requirements, forced outage rates, losses, deliverability of power project fixed costs and costs of labor, equipment, contractors. ECCO utilized its knowledge and experience in utility acceptable standards and practices and financial calculations and evaluations to identify and resolve all energy and economic issues. IESO has used the results of the ECCO Audit to renew the RMR contract for subsequent year.

Cap Gemini Ernst & Young LLC

ECCO International has been a special consultant to the ISO Solutions Group in the Cap Gemini Ernst & Young's Energy and Utilities Consulting Practice. It has provided expert advice to CGE&Y clients around the world on electric industry

restructuring, market design and software systems issues for developing Independent System Operators and Power Exchanges. He assisted CGE&Y in their bid efforts for developing software systems for the electricity markets for various clients in North America and Europe. These clients include CAL ISO, IMO Canada, ISO New England, RTO Alliance, Grid America, Portland General Electric, Pacific Corp., and Energy. He also assisted CGE&Y in developing strategy and products to serve various market participants that participate in the ISO and PX markets.

Electric Power Research Institute (EPRI)

Provided expert advice on electric industry restructuring and market design issues to utility EPRI members around the world.

Poland, PSE

Provided consulting services through EPRI in developing and implementing various elements of the wholesale energy markets in Poland, including scheduling, transmission pricing, RMR scheduling and generation adequacy, and real-time markets. It also provided consulting services in the basic design of LMP-based energy markets.

Japan, Kyushu

Provided expert advice through EPRI on the various aspects of unbundling utility functions and on the market design and transmission operations of various ISOs in the US and Europe.

Greece, Regulatory Authority of Energy (RAE)

Provides expert advice on the development and implementation of various markets in the Greek energy sector, including, scheduling, day-ahead and real-time markets, and a capacity market to ensure generation adequacy and sufficient reserve margins. ECCO is currently under contract to provide expert advice and consulting and software services on various new market elements RAE is contemplating for the Energy market in Greece. Specifically, ECCO is using its advanced energy market simulation software, ProMaxLT™, to analyze the Real-Time Dispatch market (RTD) and the design of the Tertiary Reserve market in Greece.

Hellenic Transmission System Operator (HTSO)

Since 2003 ECCO International has been engaged in a series of activities to assist the HTSO in developing and implementing a sound national energy market. Specific tasks included the design of the transmission constraints on the Hellenic transmission network in the Day-Ahead market, transmission loss analysis, the design of financial interconnection options for hedging against congestion fees, the design of signing long term ancillary services contracts and recovering the cost through uplift, and the design of capacity assurance mechanisms. ECCO International proposed a staggered capacity obligation for Suppliers for five years into the future, and a must-offer obligation for Producers with capacity contracts. ECCO International further participated in the proposed market design evaluation of Day-Ahead and Real-Time markets, demand side bidding, Day-Ahead scheduling, bid formatting, balancing adjustments, imbalance SMP calculation methodology, design of preliminary and final settlements and the design of an imbalance settlement based on balancing energy accounting and uninstructed deviation penalties. The detailed review resulted in the identification of rules that may cause a problem and recommendations, where appropriate, of rules and protocols that may need to be modified or altered in any way in order to produce an internally consistent and efficient wholesale electricity market in Greece.

In 2004 ECCO International was retained by the HTSO to assist the HTSO in providing an independent comprehensive review and analysis of the transitional power contracts. This analysis included a detailed review of the proposed

transitional contracts, identification of the market elements that may cause problems and recommendations, where appropriate, of rules and protocols that may need to be modified or altered in any way in order to produce an internally consistent and efficient capacity market in Greece. In 2005 ECCO International prepared for the HTSO the Terms of References (RFP) for the development and implementation of the Interim Software System for clearing the Day-Ahead and Real-Time Markets. This RFP contained the design of the Day-Ahead Scheduling (DAS), Intra-Day Dispatch Scheduling (DS), Real-Time Dispatch (RTD) and Ex-Post Imbalance Pricing (ExPIP). Furthermore, it included Day-Ahead and Imbalance Settlements, Market User Interface Capability, and Integration of the Interim System with the existing infrastructure at the HTSO including the current EMS/AGC system.

Since 2006 ECCO has been the key consultant to the HTSO in developing the energy market design that includes major modifications proposed by ECCO and approved by the RAE and the Greek Ministry of Development and the detailed design specifications that will be used to implement the new Power System and Market Management software platforms scheduled to be on line in 2013. The new design includes improved DAS, DS, ExPIP and RTD market applications, settlements, EMS/AGC systems, Metering and RTU systems, Cross Border trading algorithms, Capacity Assurance Mechanisms, Inter-TSO systems, Validation systems, Load Forecast, Market User Interface, Registration Systems, Reporting, Communication and Publishing systems.

Finally, since 2007 ECCO is engaged at the HTSO in developing eight (8) Business Market Manuals that include detailed market and business rules that the Market Participants in Greece will use to participate in the Greek energy market. The content of these Business Manuals is consistent with the Greek Electricity Code but contains much more detailed information that is required by the Market Participants to participate in the market. The Manuals are: a) Day-Ahead Manual (DAS), b) Dispatch and Intra-Day Scheduling Manual (DS), c) Capacity Assurance Mechanism Manual, d) Settlements Manual, e) Unit Cost Manual, f) Metering Manual, g) General Provisions Manual and h) Glossary Manual. As part of this project, ECCO is also leading the development and implementation of an e-Library software tool that will be used by the Market Participants as a vertical search engine for document management, on-line training, etc. All Business Market Manuals, regulatory filings, operating procedures, etc., will be housed in the e-Library.

In 2008 ECCO was engaged by the HTSO to provide certification of the new interim AREVA-based market clearing software. The software includes the Day-Ahead market, the Dispatch Scheduling Market, the Real-Time market, the Ex-Post Pricing function, the Market User Interface, and the Settlements function.

Public Power Corporation, National Utility of Greece

Provides expert advice and consulting services on analyzing various aspects of the Greek wholesale energy market. In 2008 ECCO was engaged by PPC to develop the energy market design, rules and protocols and the Code for the Non-Interconnected Islands. It is currently involved in developing and executing a study for calculating the cost of integrating Renewable Energy Resources (RES) into the grid in the Non-Interconnected Islands of Crete, Rhodos, Ikaria and Lesvos as a function of the penetration level. The services that will be analyzed include Regulation, Tertiary Reserves and Unit Commitment. Reliability studies will also be performed to analyze the impact on reliability of RES as a function of the level of penetration.

Government of Albania

ECCO International provided expert advice and consulting services to key members of the Ministries of energy, finance, and economy, the National Agency of Energy (NAE), the regulator (ERE), and the vertically integrated utility (KESH) in various areas, including the development of a comprehensive energy policy, improvement of electricity security and

reliability, design of tariffs that encourage conservation, reorganization and unbundling of KESH, development of a regional power market in the Balkans, and development of a commercial energy market.

A Municipal Utility

Provided consulting and software development services on settlements and billing functions and expert advice on market design and transmission issues.

Reliant

Provided consulting services on market development and design issues in the Mid West and Eastern United States.

A Software Developer

Provided consulting services on scheduling and Unit Commitment functions, electric industry restructuring, and market design.

A Software Developer

Provided consulting services on electric market designs electric industry restructuring, and software design issues.

Bonneville Power Administration

Provided expert advice on electric industry restructuring matters including transmission modeling, transmission pricing, congestion management and ancillary services.

World Bank

Provided expert advice on electric industry restructuring and the ancillary services markets.

Government of Argentina

Provided expert advice to the Ministry of Energy and Economy on various matters concerning the electricity market in Argentina, including generation bidding, transmission modeling, transmission pricing, auction of Firm Tradable Rights, generation adequacy and capacity auctions, etc.

Pacific Gas and Electric Company

Provided consulting services and power system analysis expertise on various transmission planning, operational and settlement functions. It performs various interconnection studies for new generation capacity in California.

Currently, it provides training and consulting services on the new Locational Marginal Pricing (LMP)-based energy market in California, including Forward and Real-Time markets, scheduling, Ancillary Services and congestion management, Scheduling Infrastructure and Business Rules (SIBR), and settlements and billing functions.

It is also providing extensive support to PG&E in transitioning PG&E to the LMP-based energy market in California. This includes providing extensive support, consulting and software services for LMP and CRR evaluations. ECCO is using its advanced energy market simulation software, ProMax™, to simulate the CAISO market on a daily basis to perform LMP price validation, energy market design analysis and benchmarking studies.

Spain, Regulators

Provided expert advice on electric industry restructuring and energy market design issues related to physical bilateral contracts.

Baltic States, Utilities

Provided consulting services on electric industry restructuring and market design issues related to pooling arrangements.

LCG

Provided expert advice in analyzing forward and real time market data for various ISO markets in the US.

Pierce Atwood (Law Firm)

Provided expert advice on electric industry restructuring and market design issues for the Albanian market.

EMA/American Water Works Association

Provided experts advice and consulting services in the area of forecasting applications in a competitive environment.

Southern California Edison

Provided training and consulting services on the new Locational Marginal Pricing (LMP)-based energy market in California, including Forward and Real-Time markets, scheduling, Ancillary Services and congestion management, Scheduling Infrastructure and Business Rules (SIBR), and settlements and billing functions.

Currently ECCO International is providing extensive support to SCE in transitioning SCE to the LMP-based energy market in California. This includes providing extensive support in redesigning its existing market and settlements systems and providing consulting and software services for LMP and CRR evaluations. ECCO is using its advanced energy market simulator suite, ProMaxLT™ and CSS™, to simulate the LMP-based market in California, predict long-term LMP prices and perform detailed CRR studies with a one year to 10 year time horizon using a detailed Full Network Model (FNM) of the California transmission grid.

Northern California Power Authority (NCPA)

Provided training and consulting services on the new Locational Marginal Pricing (LMP)-based energy market in California. This included training and consulting on Forward and Real Time markets, Ancillary Services and Congestion Management, Scheduling, Reliability Unit Commitment and Market Power Mitigation, Settlements, CRR market, LMP transmission pricing, and network modeling, and the development and implementation of the software systems to support the new CAL ISO markets.

MIRANT (US Generator)

Provided training and consulting services on the new Locational Marginal Pricing (LMP)-based energy market in California. This included training and consulting on Forward and Real Time markets, Scheduling, Reliability Unit Commitment, Market Power Mitigation Settlements, CRR market, LMP transmission pricing, and network modeling, and the development and implementation of the software systems to support the new CAL ISO markets.

MMC Energy

provided consulting services and expertise on Ancillary Services bidding, Certification, AGC support and strategic advice in bidding into the Real time market in California.

Austin Energy

Provided expert advice and consulting services to prepare Austin Energy for the new Texas Nodal Market. This includes a needs assessment and a gap analysis study, a capability assessment study, the development of an RFI and the evaluation of software vendors for providing software services in the areas of EMS, Market Systems, Scheduling and bid creation, Deal Capture, and transaction evaluation, and Settlements and Billing systems required to support AE's operations in the Texas Nodal Market.

Southern California Public Power Authority

provided training on the new Locational Marginal Pricing (LMP)-based energy market in California with emphasis on the Scheduling Infrastructure and Business Rules (SIBR) system. These services were offered to Anaheim Public Utilities, Los Angeles Power District, City of Pasadena, City of Glendale, and City of Riverside.

JPMorgan Chase Bank

provided training on the new Locational Marginal Pricing (LMP)-based energy market in California. The focus of the training was on the Integrated Forward Market, the Real Time Market and the Hour-Ahead Scheduling Process, the Reliability Unit Commitment, Market Power Mitigation, the Scheduling Infrastructure and Business Rules (SIBR) system, LMP Pricing, and the Congestion Revenue Rights Markets.

RBS SEMPRA Commodities

provided training on the new Locational Marginal Pricing (LMP)-based energy market in California. The focus of the training was on the Integrated Forward Market, the Real Time Market and the Hour-Ahead Scheduling Process, the Reliability Unit Commitment, Market Power Mitigation, the Scheduling Infrastructure and Business Rules (SIBR) system, Bilateral Contracts, LMP Pricing, and the Congestion Revenue Rights Markets.

Integrlys

provided training on the new Locational Marginal Pricing (LMP)-based energy market in California. The focus of the training was on the Integrated Forward Market, the Scheduling Infrastructure and Business Rules (SIBR) system, the Inter-SC Trades and the Import/Export Modeling.

E.ON. US

ECCO conducted a study and provided a report to assist E.ON U.S. to make resource allocation decisions when confronted with the opportunity or obligation to serve various levels of additional Non-Conforming Loads (NCLs) principally arc furnace type steel mill customers. ECCO's detailed analysis of NCLs revealed a cyclical load pattern consisting of a "peak" duration of approximately 9 to 11-minutes with a drop off to a minimum for approximately 3 to 4-minutes. NCL greatly impacts an electric utility's ability to meet Area Control Error (ACE) minimum compliance. The analysis relied on data of the E.ON U.S. system including ACE, unit data, tie-line flows, arc furnace melt cycles, characteristics of NCLs, etc. ECCO used these data to perform a detailed analysis by selecting specific time periods and variations of generation and load to determine the reliability impacts of NCLs using accepted engineering practice and approved standards.

The report provided the results on the reliability impacts (i.e., frequency regulation characteristics) of NCL for various E.ON U.S system conditions. ECCO performed two separate impact assessments as part of the project using additional NCLs that were added to the E.ON U.S. system in the future. The assessment studies focused on the NERC reliability standards and the impact the NCLs would have on the ability of E.ON U.S. to consistently comply with NERC CPS1 and CPS2 criteria.

California Energy Commission

ECCO International is under Contract for providing consulting services on the California market settlement methodology for the collection of current and future charge types associated with the existing CAISO settlement system and the new settlements under MRTU with the objective to identify the charges that are sensitive to Demand Response, document the derivation of associated settlement calculations, and identify the data sources required as inputs to the calculations. ECCO will also provide advice on how to estimate settlements for charge types that are most sensitive to Demand Response. ECCO will develop a Demand Response triggering methodology and draft the business and system requirements for the implementation of a Demand Response program.

Power Plant Development

Provided consulting services for developing a 750MW natural gas combined cycle power plant project in Southwest Michigan, USA. The project's configuration is two gas turbines on one steam turbine with duct firing during summer.

Power Plant Development

Provided consulting services for developing an 1,100MW natural gas combined cycle power plant project in North Carolina, USA. The project's configuration is three gas turbines on two steam turbines with duct firing. The project used GE's technology for both the gas and steam turbines.

Power Plant Development

Provides consulting services for supporting a developer on a natural gas simple gas turbine cycle for 500MW peaking power plant in northeast USA. The project will use the most advanced GE's gas turbine technology.

For More Information Contact

If you would like information on how to put ECCO International's global experience to work for you, please contact us at:

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