Siemens PTI Expands Economic Analysis Client Services

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Siemens PTI provides independent consulting services to a wide range of clients including electric utilities, government agencies, independent system operators, project developers, energy traders, and the financial community. In addition to our Network Analysis that focuses on reliability and the technical feasibility of projects, we now provide services for the economic analysis of transmission systems and financial feasibility of projects. This includes the assessment of electricity prices and generator schedules based on market simulation.

Assessing the viability of any major energy sector project, apart from accounting for the cost of the project itself, requires an estimate of revenue and an identification of uncertainties and risk factors. In today’s competitive environment, the determination of quantity and price must consider the factors of competition and deliverability, in addition to generator technology and fuel cost. These factors impact both the quantity of energy that is required from a power plant and the anticipated price. Market simulation relies on sophisticated security-constrained unit commitment (SCUC) and security-constrained economic dispatch (SCED) programs. These are used to simulate the daily market clearing process that determines prices and schedules. Very briefly, the SCUC determines when generators will be started and stopped; the SCED determines generator schedules (quantities) and prices, from which revenues are determined.

The price of electric energy at a particular location (the locational marginal price or LMP) can vary widely throughout the day. LMP also has seasonal changes and variations based on daily profiles. The demand for energy also exhibits these variations and is a major factor in projecting LMP. Determining price and quantity, subject to competition and deliverability, requires SCUC and SCED to evaluate the complex interactions among all competitive resources in the constrained electric system. Siemens PTI consulting uses the software PROMOD IV from Ventyx® (recently acquired by ABB) to perform market simulations for our client studies. The added capability to perform market simulations, assessing financial feasibility, categorically expands the services that we can perform for our clients. The following outline provides a generic summary of additional study capabilities:

Transmission
- Evaluate congestion costs
- Economic basis for system expansion
- Valuation of financial transmission rights
- Effects of outages on market prices
- Asset valuation
- Impacts of proposed transmission alternatives

Demand and Retail
- Expected energy cost
- Demand response

Generation and Trading
- Expected revenues and schedules
- Operating costs
- Risk profiles
- Site location
- Asset valuation
• Analysis for financial funding decisions
• Renewables

Regulators
• Market structure
• Tariff design
• Retail pricing
• Analysis for policy decisions

Training
• Fundamentals of LMP Energy Markets

From the broad application of economic analysis methods across the energy sector, here are three recent examples where long-standing Siemens PTI clients are requesting services:

1. An Independent System Operator (ISO) issued a competitive bid for quantifying impacts on transmission network congestion. The study requires market simulations to estimate how constraints on transfer of energy across the bulk power transmission system impact the cost of producing electricity, based on multi-regional models, forecasts for network expansion, and protocols for generation dispatch. Previously, Siemens PTI has performed reliability studies for this organization, and can now effectively bid on all economic and reliability planning process opportunities.

2. A generation developer requested economic analysis for multiple alternatives to repowering an aging facility facing dramatic regulatory changes and uncertainties. Our proposal featured extensive production cost modeling (PCM), running market simulations for quantitative analysis of asset valuation factors including fast start, turndown, emissions, and fuel price sensitivity on project revenue, variable costs, operating margins, and plant capacity factors. Combining location-specific power flow analysis with this economic assessment, we provide the client exceptional insights for how alternatives impact both financial outcomes as well as network reliability requirements.

3. We are currently performing feasibility studies on four proposed interconnection sites for a transmission developer. The developer has requested that we expand our scope to include price impact analysis, forecasting prices based on transmission constraints for each potential point of interconnection. For this purpose, we will develop the additional models, calculate LMPs for selected dispatch scenarios and deliver comparative economic assessments.

These examples demonstrate how Siemens PTI Consulting can now combine physical and economic analysis services to bring together all the necessary factors needed to perform these complex studies. Siemens PTI will continue to lead the industry developing innovative services, enabling effective decisions and optimal solutions for our clients.