Optimal Power Flow Analysis

ICF International's wholesale power team supports private- and public-sector clients by providing economic and technical services and policy analyses that enhance our client's ability to make the best strategic and resource development decisions.

Our transmission services include:

- Locational Marginal Pricing (LMPs)
- Congestion Forecasting
- Forecasting Interregional Transmission Capacity
- Reactive Power Valuation
- Voltage Support Issues
- Generation and Transmission Interconnection Assessments
- System Impact Studies
- System Stability Studies
- Siting of Generation and Transmission Assets

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Passion. **Expertise. Results.**

ICF International provides **Optimal Power Flow (OPF)** simulation of the interconnected power markets for clients needing detailed power flow analyses, Locational Marginal Pricing (LMP) and congestion forecasts, and transmission line/interface loadings. ICF performs OPF modeling and provides specific results for any location(s) in the interconnected United States and Canadian transmission systems. OPF is a cost-effective way to forecast snapshots of LMPs under various conditions of load and generation patterns and generator bidding strategies. It simulates the inter-connected transmission system based on economic dispatch, and it endogenously incorporates the limitations of transmission facilities.

ICF's OPF analysis will:

- Assess generation interconnection impacts on the grid and the associated costs of transmission upgrades
- Analyze generation Reliability Must Run (RMR) requirements for transmission-constrained sections of the grid
- Provide seasonal hourly snapshots of line loadings — peak load or off-peak load conditions — and LMPs for any geographic region
- Assess the impacts of generation injections and/or load withdrawals on transmission facilities and on congestion-related costs or benefits
- Identify optimal interconnection nodes to maximize value of transmission investments
- Identify optimal generation interconnection points to safeguard against nonnegative LMP prices
- Provide an independent analysis of utility estimates of interconnection and transmission upgrade costs (in power-flow mode)
- Provide quantitative analysis and subsequent market valuation of locational voltage support issues and reactive power supply and absorption
- Provide forecast of transmission capacity across market interfaces

Featured Projects

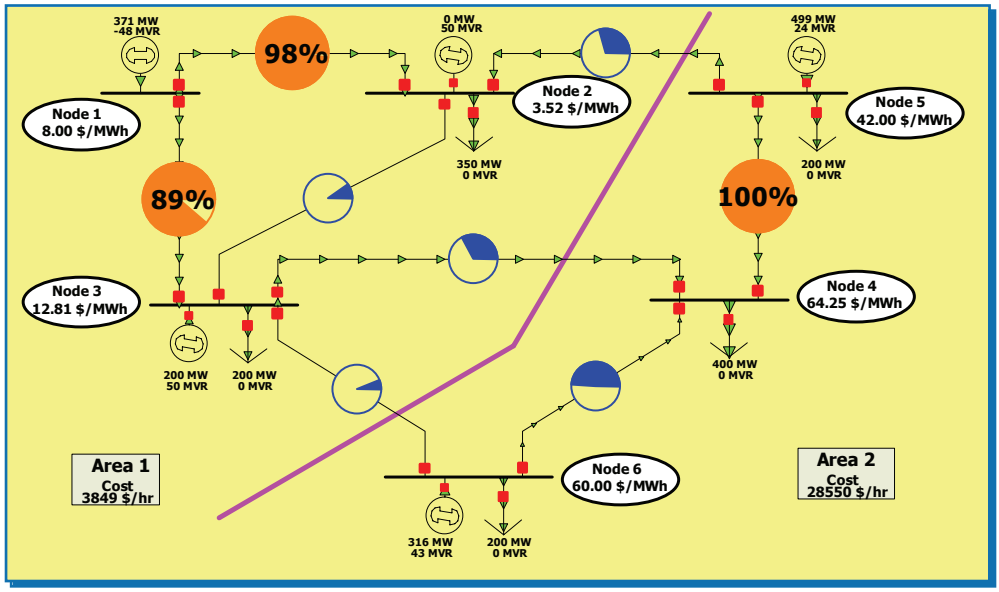
Reliability Must Run (RMR) Assessment
ICF performed an independent assessment to estimate the economic RMR requirements for a load pocket in the Western Electricity Coordinating Council (WECC) market for an Independent Power Producer. We identified the maximum economic RMR requirements from utility generators in the load pocket.

Siting Analysis
ICF identified suitable sites to build a 500 MW combined-cycle generation unit for a client entering the Wisconsin power market. The study considered potential risk factors such as demand growth, existing installed capability, transmission adequacy, voltage support and transmission congestion issues that could affect the deliverability of megawatts.

Optimal Power Flow Simulation
ICF performed an optimal power flow simulation of the WECC market to determine dispatch scenarios for a large power plant in the Palo Verde, Arizona region. The work included the economic dispatch of units, contingency analysis, and snapshots of expected summer peak nodal prices. This analysis demonstrated the capability of the transmission system to deliver power to market with all transmission facilities in service and under various contingency scenarios.

Value of Reactive Power
ICF estimated the market value of supplying reactive power from a portfolio of units to maintain flowgate capacities between two regional markets in the Mid-Atlantic region. The study estimated the target portfolio's leverage to keep the flowgate open between the regions and convert the leverage into value.

Sample Two-Area Optimal Power Flow Analysis



About ICF International

ICF International (Nasdaq: ICFI) partners with government and commercial clients to deliver consulting services and technology solutions in the energy, environment, transportation, social programs, defense, and homeland security markets. The firm combines passion for its work with industry expertise and innovative analytics to produce compelling results throughout the entire program life cycle, from analysis and design through implementation and improvement. Since 1969, ICF has been serving government at all levels, major corporations, and multilateral institutions. More than 2,000 employees serve these clients worldwide. ICF's Web site is http://www.icfi.com.

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