



ENERGY SERVICES

Wholesale Power Services

- Forward Price Forecasting
- Transmission/Fuel Analysis
- Due Diligence/Project Financing
- Litigation Support/Expert Testimony

Environmental Services

- Air Emissions Strategy/Compliance Planning
- Multi-Pollutant Analysis
- Regulatory Policy Support/Impact Analysis
- Greenhouse Gas/Climate Change Strategies

Fuel Services

- Supply Assessments/Project Evaluation
- Strategy Development/Implementation
- Market Assessments/Forecasting
- Oil/Gas Pipelines/Storage Planning

Energy Software Services

- Transmission/Distribution Planning
- Profiling/Forecasting
- Billing/Settlement
- Full Software Implementation/System Integration Support

Emerging Energy Services

- Business Strategies/Planning
- Applied Technologies/E-commerce
- Risk Assessment/Commercial Structuring
- Financial Services/Capital Sourcing

What is the best mix of assets to hold for the risk we are willing to absorb? What are the key asset decisions we should make and when should we make them? What options should we exercise? These questions relate to every potential change in your generation and transmission asset portfolio, and ICF Consulting can help find the answers.

We define **Portfolio Optimization** as the process of implementing strategy and information technology solutions to maximize the value and manage the risk of integrated energy portfolios over the near-, medium-, and long-term. We apply robust mathematical approaches including Stochastic Programming and Real Options Valuation to develop portfolio and operational solutions. Our approaches focus on delivering flexible strategies that adapt to changing markets and regulations. Our Portfolio Optimization team offers expertise in the following three areas:

Asset Optimization provides support for a wide set of problems, ranging from long-term investment decisions (e.g., the purchase of a power plant or decision to install pollution controls) to medium-term strategy support (e.g., implementing the right mix of contracts and options).

Asset Deployment characterizes short-term (e.g., daily) operational decisions on assets. Examples include gas traders' daily nomination decisions on gas purchases to meet generation demand.

Asset Valuation determines the value of a tangible or intangible asset (e.g., a tangible power plant or the intangible emissions allowances). ICF Consulting takes a comprehensive view, analyzing all classes of physical and contractual assets. To carry out this work, ICF Consulting's experienced staff applies proprietary market- and decision-support models that are specifically designed for the energy sector.

- **IPM[®]** (Integrated Planning Model): A long-term, fundamentals-based power market model that takes into account transmission, environmental, regulatory, fuel supply, and plant dispatch constraints.
- **NANGAS[®]** (North American Natural Gas Analysis System): An integrated gas market model that combines supply, demand, transportation, storage, and market factors.
- **EADSS[™]** A flexible network-based model that can represent multiple asset types (e.g., gas and power together) along with detailed market and operational rules in a stochastic modeling framework that considers uncertainties in its optimization process. The model contains simulation and optimization modules in an integrated framework.

What sets ICF Consulting apart from others is our in-depth knowledge of energy and environmental market dynamics, and corresponding natural synergies and hedges, and our ability to integrate your priorities into the analytic process. We believe that reliance on historical volatility estimates and near-term forward curves will lead to sub optimal performance. Our approach uses market-based, short- and long-term forward-looking projections and incorporates alternate views of power, fuel, environmental, and transmission uncertainties into an integrated valuation and decision-support framework. A solid understanding of the energy market, together with our versatility, creativity and flexibility in offering innovative solutions tailored to your needs, is why ICF Consulting successfully delivers quality and insightful consulting services in **Portfolio Optimization**.

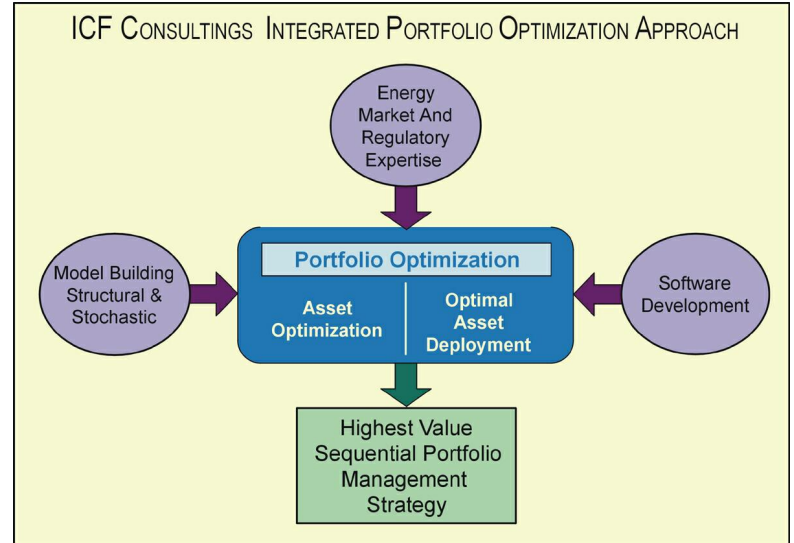
Featured Projects

Natural Gas Asset Deployment Optimization

For a large integrated gas and electric utility that recently acquired significant natural gas assets, ICF Consulting developed a proprietary software system (EADDSTM) to assist with their daily and monthly/seasonal operational decisions. Using stochastic dynamic linear programming, the software helps to deploy gas supplies, storage, and gas transportation assets in a way that increases asset profitability in a highly uncertain business environment. ICF Consulting also provided an interface program that automatically imports gas contract and deal data, power generation data, and price data from the client's existing systems into one integrated database on which the optimization tool operates.

Natural Gas Pipeline and Storage Valuation

ICF Consulting assessed the value of a proposed natural gas pipeline and storage unit in the Southwest for a private power company. Our approach identified when and which gas pipeline capacity would likely be saturated, and illustrated how and to what extent the proposed storage and additional pipeline would alter flow patterns and enhance deliverability. ICF Consulting used its proprietary software system (EADDSTM) to simulate the electric and gas markets in the region from 2004 through 2015. We developed forecasts of electric demand, power gas demand, and non-power gas demand, and modeled the pipeline usage based on capacity limits, simulated demand on gas and power, and generation dispatch.



Real Options Analysis for NO_x Control Investments

ICF Consulting recently assisted a private U.S. energy company in evaluating multiple control options and NO_x allowance market strategies to maximize profitability and manage risk. Applying a real options valuation framework, we determined the highest value sequential investment strategy given the tremendous uncertainty in the power market, gas market, control market, and air regulatory environment. ICF Consulting conducted specific analysis of oil/gas steam unit dispatch under alternate oil prices and evaluated various forward market strategies to lock in revenues from control projects. Our expert recommendations were used directly in the client's negotiations with vendors in support of contract terms.

About ICF Consulting

ICF Consulting is a leading management, technology, and policy consulting firm. Drawing upon extensive industry knowledge, distinguished professionals, and innovative analytics, the firm develops solutions to complex defense, homeland security, energy, environment, social program, and transportation issues. ICF Consulting's approach to these issues is strengthened by its expertise in information technology, organizational improvement, program management, and communications. Since 1969, ICF Consulting has been serving major corporations, government at all levels, and multinational institutions. More than 1,200 employees serve these clients from key business centers in the Americas, Asia, and Europe.

To reach us or obtain further information about ICF Consulting's services to the energy sector, call us at [703-934-3637](tel:703-934-3637), e-mail us at energy@icfconsulting.com, or visit our Web site at www.icfconsulting.com.

Phil Mihlmester
Senior Vice President
Phone: 703.934.3560
PMihlmester@icfconsulting.com

Bill Pepper
Senior Vice President
Phone: 703.934.3310
BPepper@icfconsulting.com

John Blaney
Senior Vice President
Phone: 703.934.3367
JBlaney@icfconsulting.com